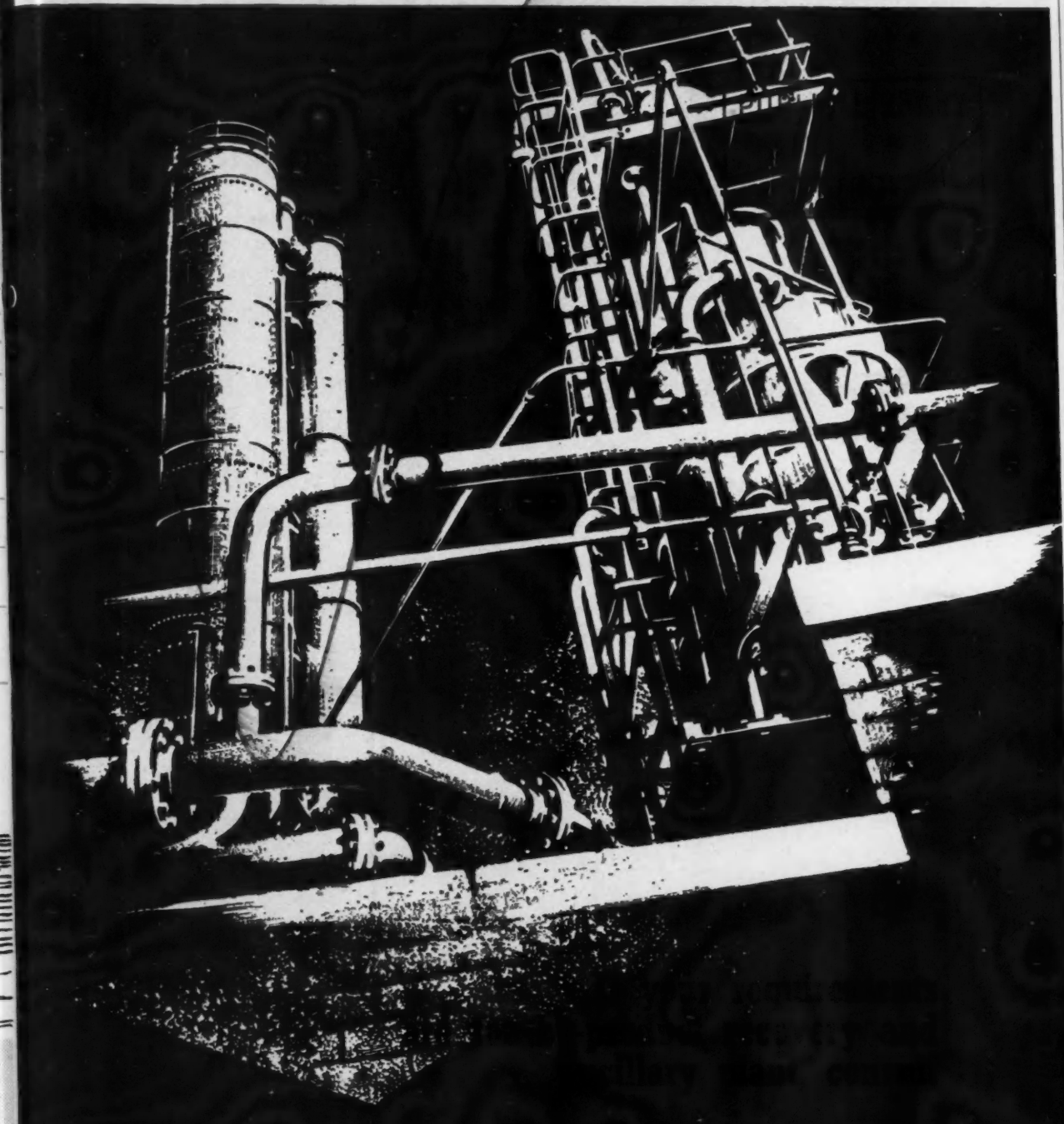
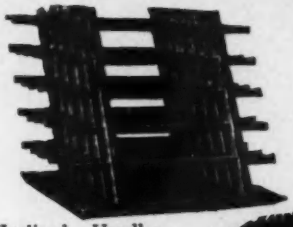
TECHNOLOGY DEPT.

Gas Journal

VOL. 287. 108th YEAR. LONDON, SEPTEMBER 5, 1956. No. 4860. PRICE 1/6



HOLMES



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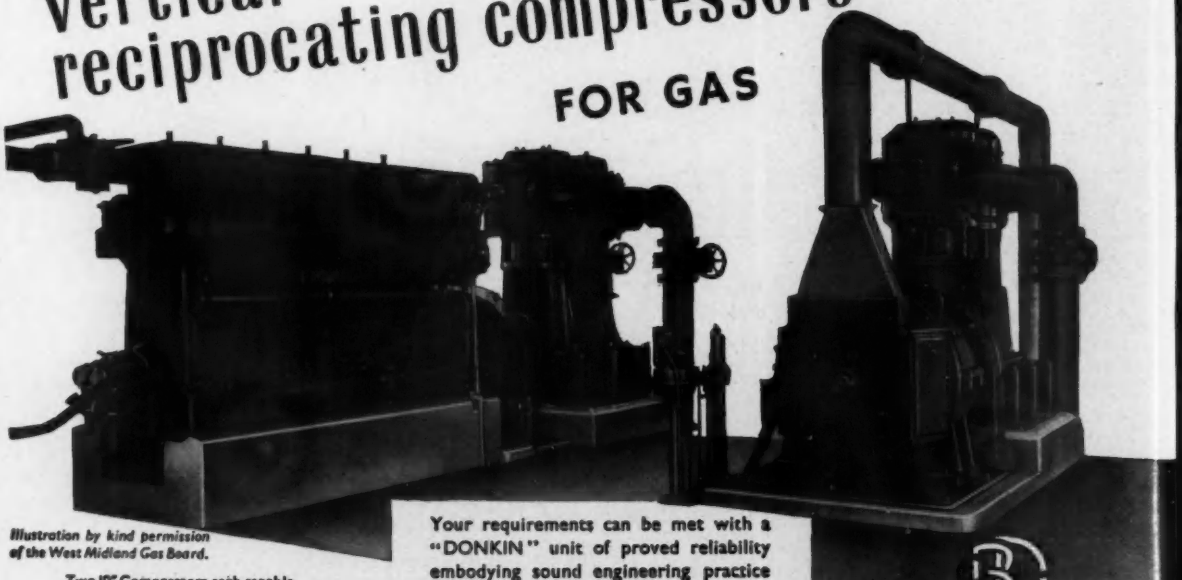

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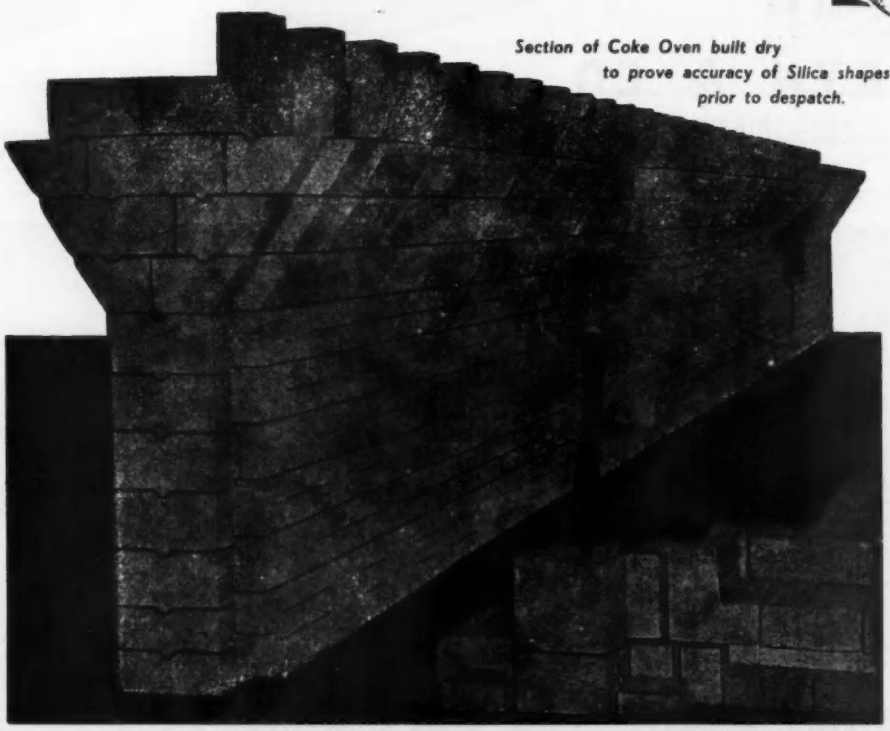

Section of Coke Oven built dry to prove accuracy of Silica shapes prior to despatch.

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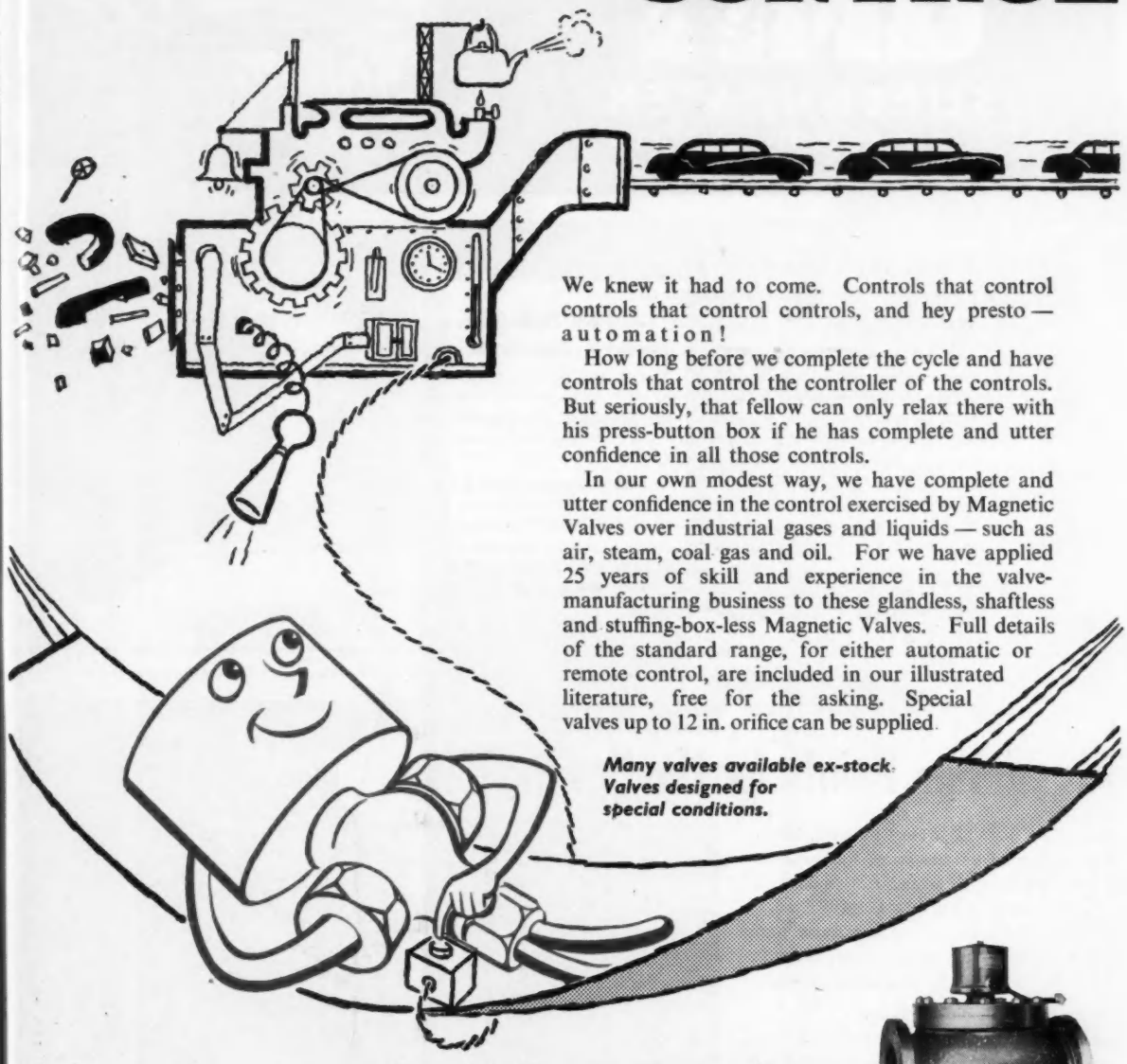

We knew it had to come. Controls that control controls that control controls, and hey presto — automation!

How long before we complete the cycle and have controls that control the controller of the controls. But seriously, that fellow can only relax there with his press-button box if he has complete and utter confidence in all those controls.

In our own modest way, we have complete and utter confidence in the control exercised by Magnetic Valves over industrial gases and liquids — such as air, steam, coal gas and oil. For we have applied 25 years of skill and experience in the valve-manufacturing business to these glandless, shaftless and stuffing-box-less Magnetic Valves. Full details of the standard range, for either automatic or remote control, are included in our illustrated literature, free for the asking. Special valves up to 12 in. orifice can be supplied.

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M.V. 5

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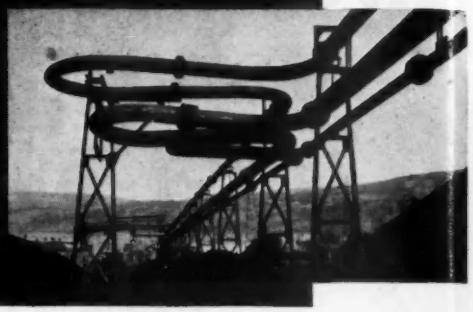

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Tubular products of all descriptions for power stations and industrial steam raising plants.

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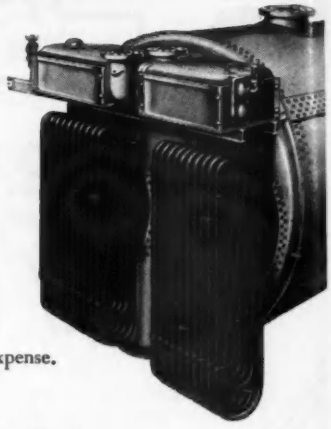
These advantages are possible by utilizing, re-circulating and flashing to steam, existing condensate water. The Unit system accomplishes more with less expense.



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A general purpose paint of the highest quality and durability and possessing great brilliance. For indoor and outdoor use. Whilst not specifically designed as a heat resisting coating "METTAL" will stand temperatures around 212°F (100°C).

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Specifically designed for indoor and outdoor use on metal surfaces up to 350° F (177°C).

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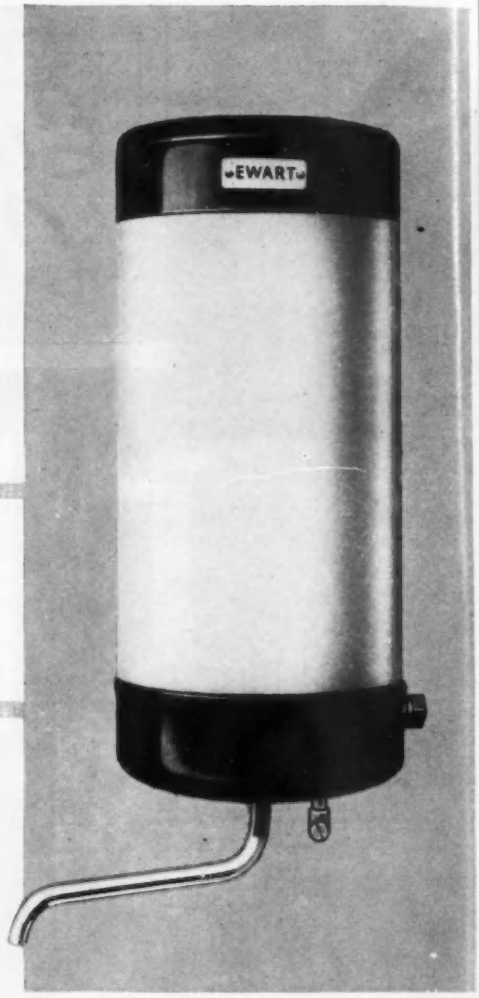

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CHOICE OF COLOURS · QUICK ACTION
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Specially designed for the "small consumer" who wants piping-hot water quickly and cheaply, the new Ewart S.18 storage sink water heater offers a splendid hot water service at the sink for amazingly low cost. It provides 1¼ gallons at a time at 140°F or smaller quantities at even higher temperatures. When its full 1¼ gallons capacity is drawn off all at once, the S.18 will have the same amount of hot water ready again in 8 minutes. Smaller amounts take proportionately less time.

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STAINLESS STEEL BODY giving improved stratification. All-welded joints eliminate risk of damage through over-heating.

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FOR ALL GAS GROUPS: The S.18 is fitted with a non-adjustable gas governor of one of two types for operation on different gas groups. Its burners are fitted with Bray miniature jets (types J or E). The fitting of the appropriate governor/jet combination by the manufacturers enables the S.18 to operate perfectly on any one of the four gas groups.

LIGHTWEIGHT AND HANDSOME. The S.18 is available with top and bottom caps in any of three attractive colours: light gold, rose-pink and black. Weight only 7 lbs. when empty.

EASILY FITTED. A paper template pinpointing the fixing centres is supplied with every heater.

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BETTER PROTECTION..LONGER LIFE..LOWER UPKEEP COSTS!

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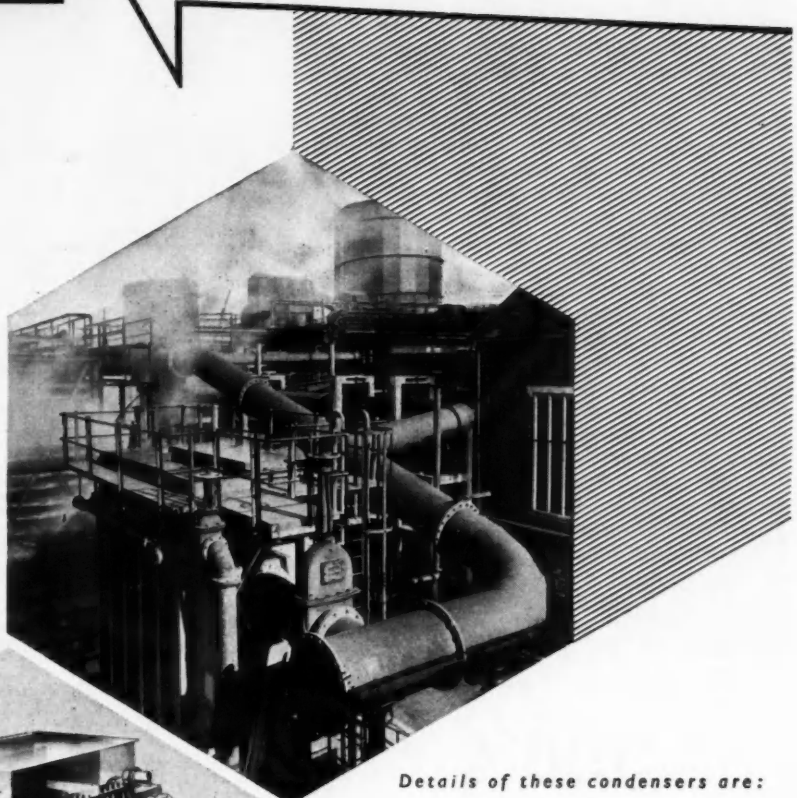
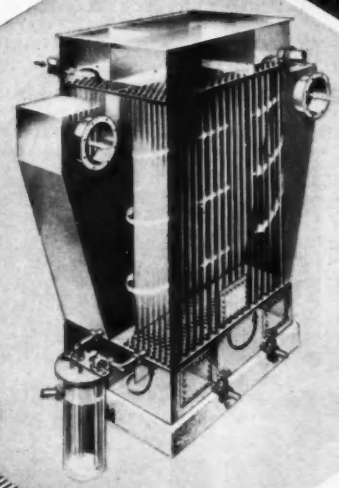
WHESSOE

CROSS FLOW CONDENSERS



Since the introduction of this extremely efficient gas cooling unit 20 have been placed on order and 13 of them are already in operation. The total capacity of these condensers is over 80,000,000 cu. ft. per day.



Details of these condensers are:

Customer and Location	No. Condensers	Total Capacity of Condensing Plant
Scottish G.B., Paisley	2 (P)	8 mill. cu. ft./day*
W. Midlands G.B., Redditch	2 (P)	3½ ,, ,, ,, *
Wales G.B., Aberavon	2 (S)	6½ ,, ,, ,, *
N. Western G.B., Linacre	2 (P)	8 ,, ,, ,, *
N. Western G.B., Bolton	2 (S)	8 ,, ,, ,,
Consett Iron Co., Consett	3 (P)	24 ,, ,, ,, †
S. Western G.B., Devonport	1	2½ ,, ,, ,, *
S. Eastern G.B., Gillingham	2 (S)	3 ,, ,, ,, *
E. Midlands G.B., Neepsend	2 (P)	5 ,, ,, ,,
Southern G.B., Oxford	2 (P)	12 ,, ,, ,,

*operating †2 condensers operating
S—series P—parallel Remainder building or on order

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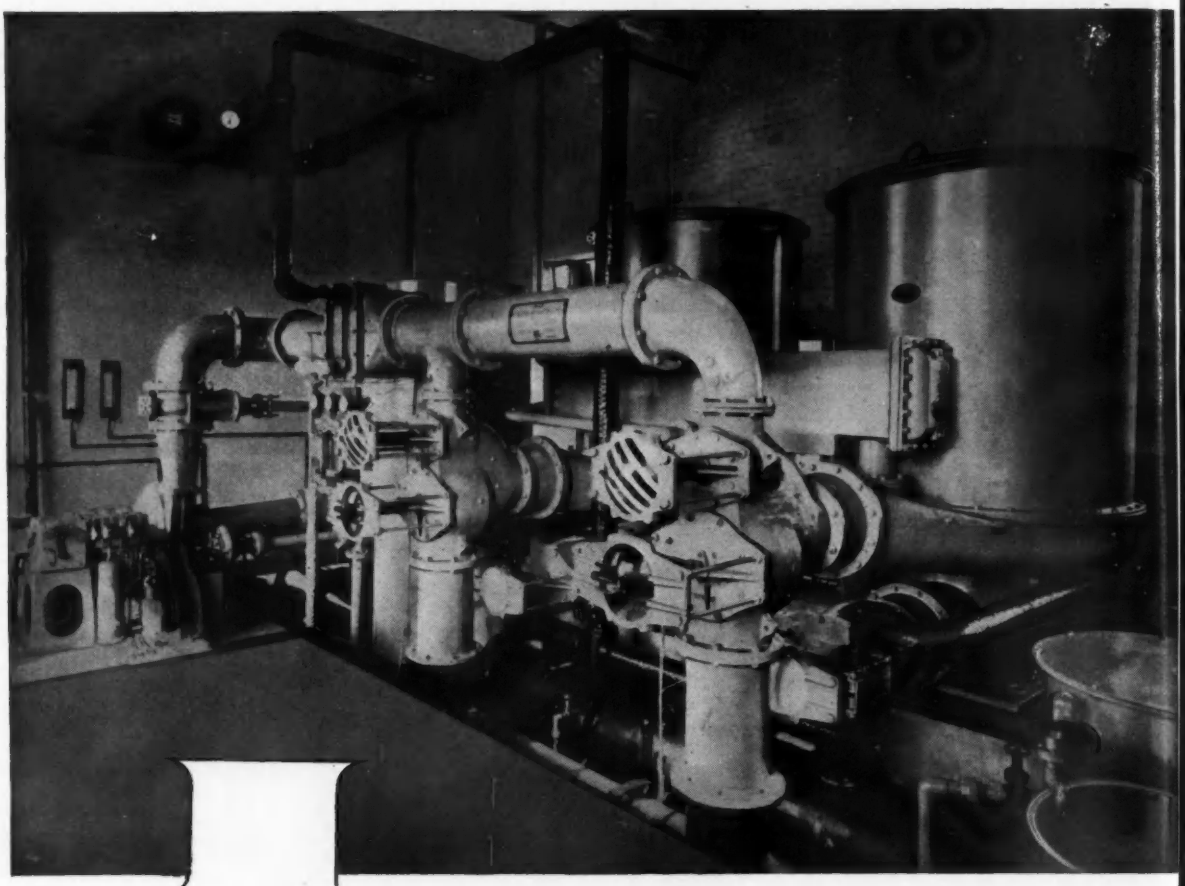

100% recovery of Benzole

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100% recovery of Benzole has been recorded in the Gas Industry where Sutcliffe Speakman plants of the type illustrated are already installed.

These recovery plants are the result of over twenty years' experience in the manufacture and industrial use of Active Carbon. Their capacities range from 250,000 cu. ft. per day. Entirely automatic and with few moving parts, they are compact, clean in operation, and economical to run. Their initial cost, too, compares favourably with that of other recovery systems. In every way they are the most profitable investments. We are always ready to draw up a complete balance sheet for Benzole recovery in any specific undertaking of the Gas Industry.

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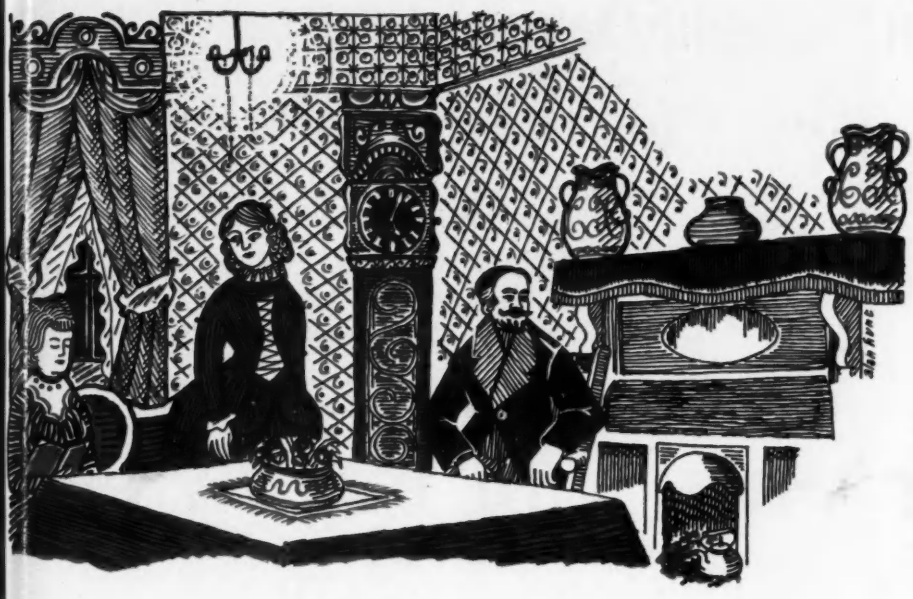
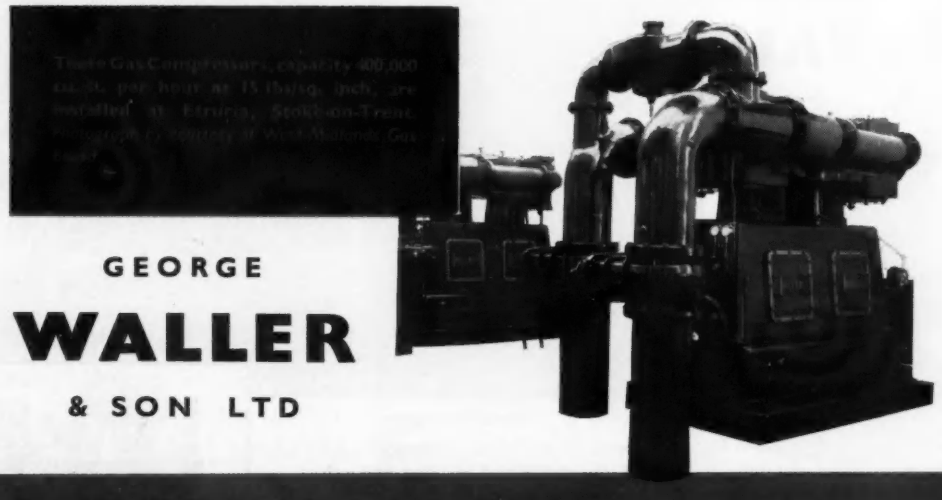


This Changing World

The Victorians by Gaslight

At eventide, the only sound to disturb the soft hiss of the gas is the occasional clop-clop of a passing hansom cab. Mamma reads an improving book, while Papa—tired from a day at his office—waits sleepily for the maid to announce that dinner is served.

By 1870 most well-to-do city homes were lit by gas, a transformation which the introduction of the successful fish-tail burner had done much to accelerate. Gas supplies too were becoming more reliable as operating experience was gained and specialised production plant installed, such plant and machines as, even then were coming from the Phoenix Iron Works at Stroud in Gloucestershire.



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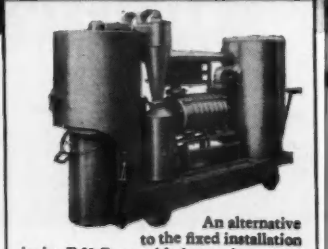

An alternative to the fixed installation is the B.V.C. portable heavy duty plant.

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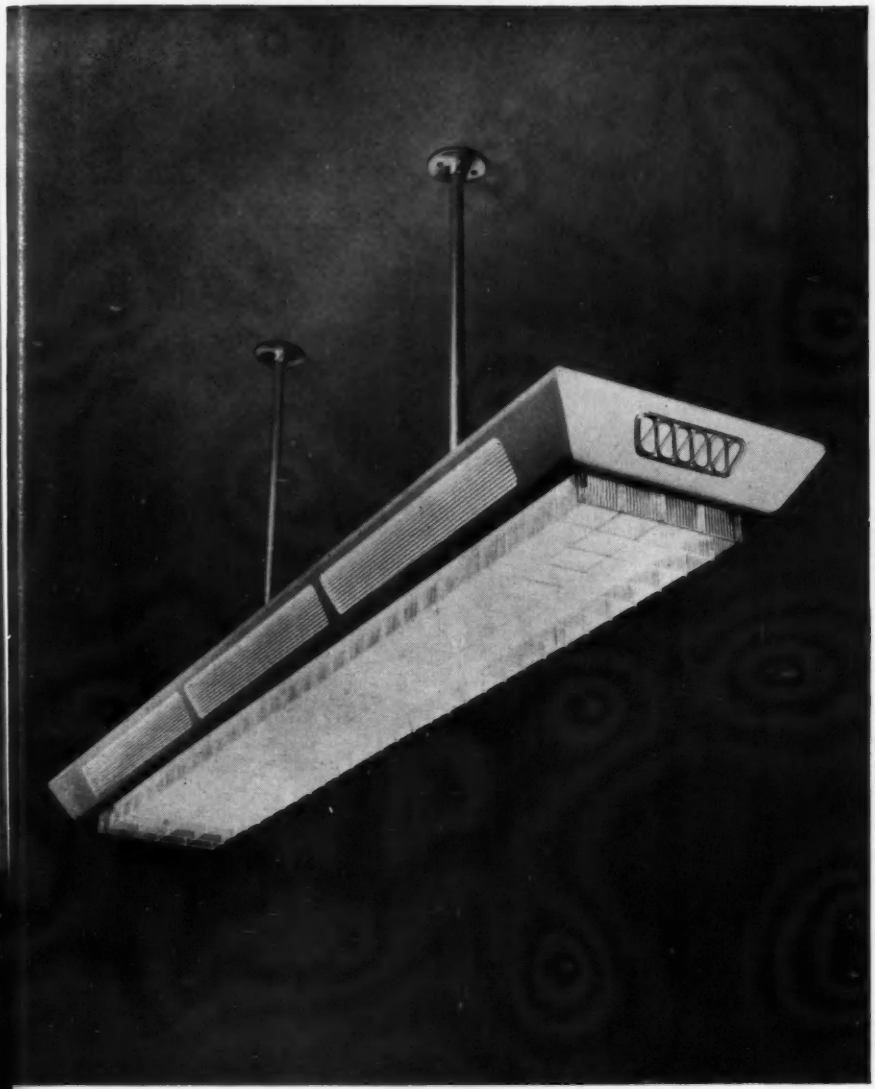

Fitting illustrated
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- *Each fitting is the result of the closest collaboration between expert designers and lighting engineers.*
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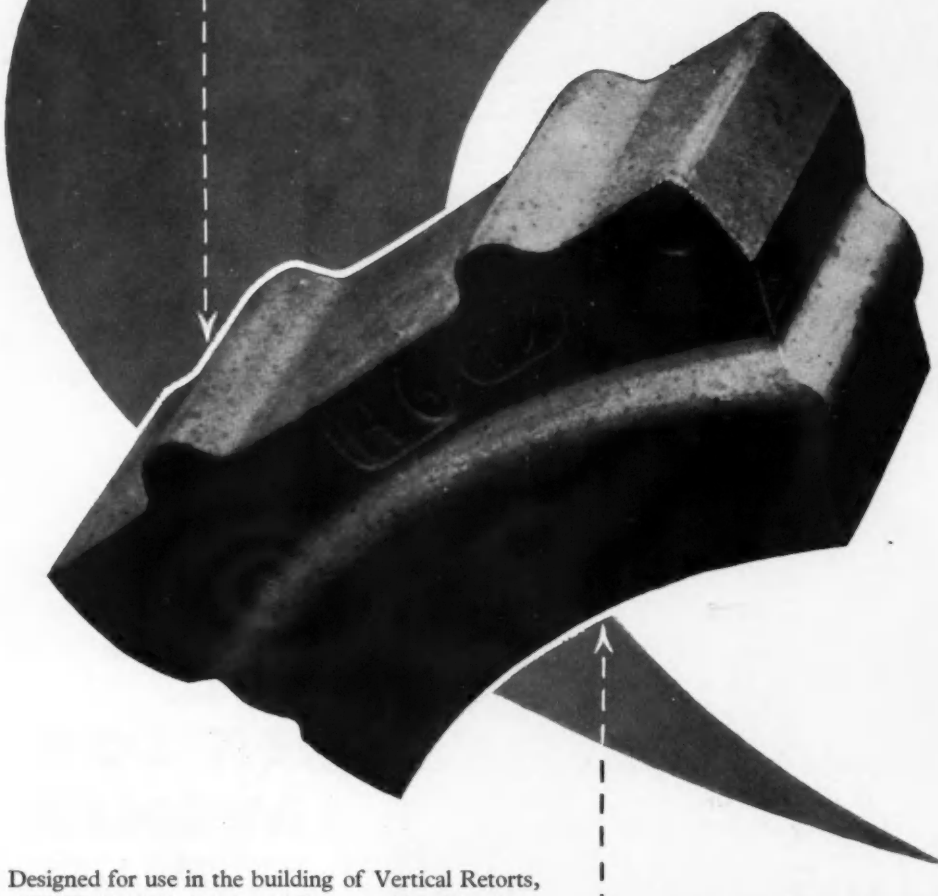
- *Consult your contractor for the most suitable G.E.C. fittings . . . with OSRAM tubes of course.*

G.E.C.

● *The General Electric Co. Ltd, Magnet House, Kingsway, London WC2*

Introducing



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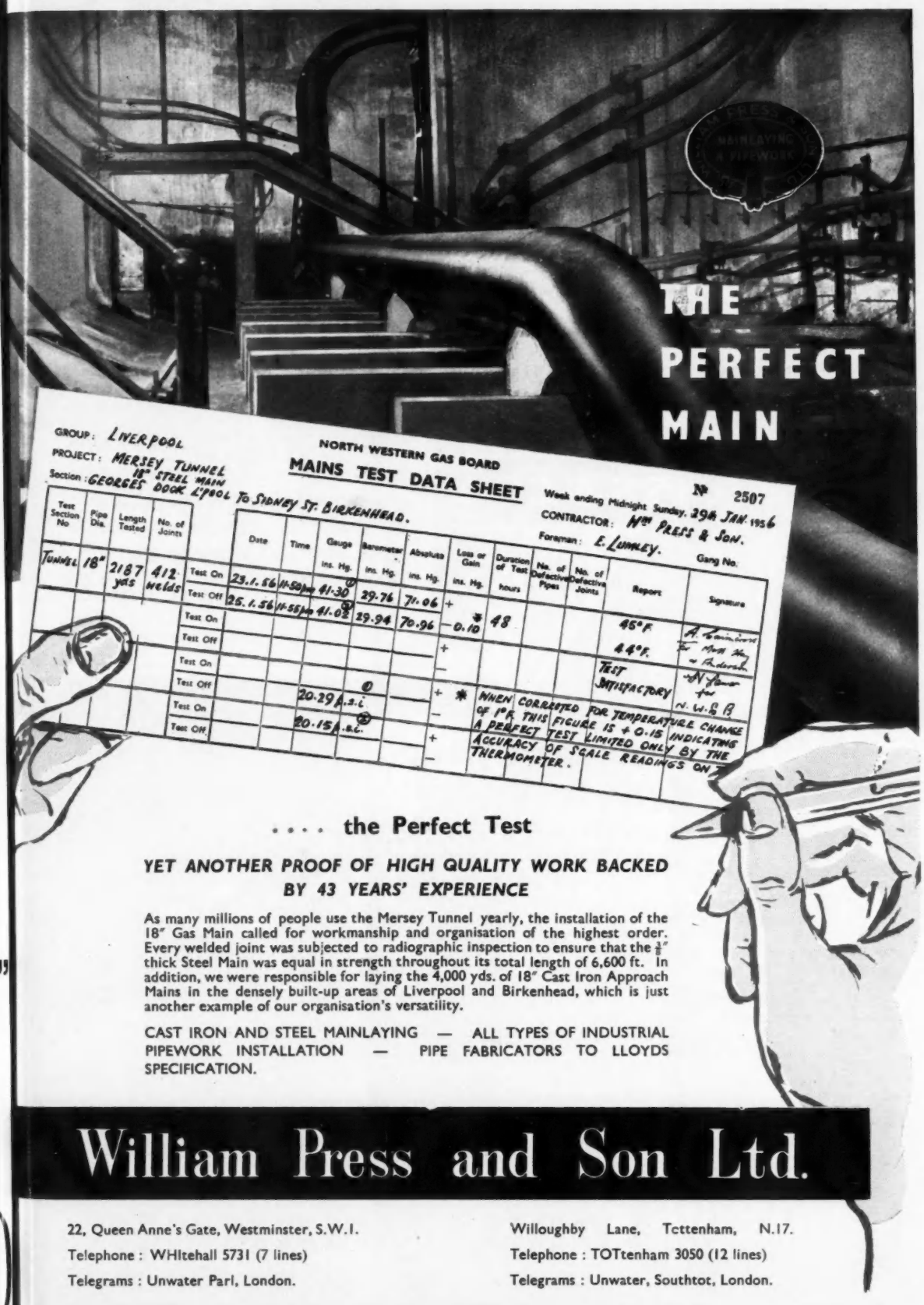

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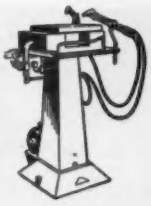

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Turn an ordinary electric drill into a sturdy hard-working power hammer, simply by slipping a Rawlplug Drill-Hammer into the chuck! This ingenious device converts rotary motion into percussion—one blow per rev. of the drill; with it you can bore concrete, etc. (up to ¾" holes) at really surprising speeds. Weight of blows adjustable to 'light', 'medium' or 'heavy'.

The Rawlplug Drill-Hammer is light and easy to use, yet has ample strength for long service and the severe treatment of practical conditions. An automatic clutch ensures that percussion takes place only when the tool is pressed against the masonry.

This tool will save you a lot of time and money—

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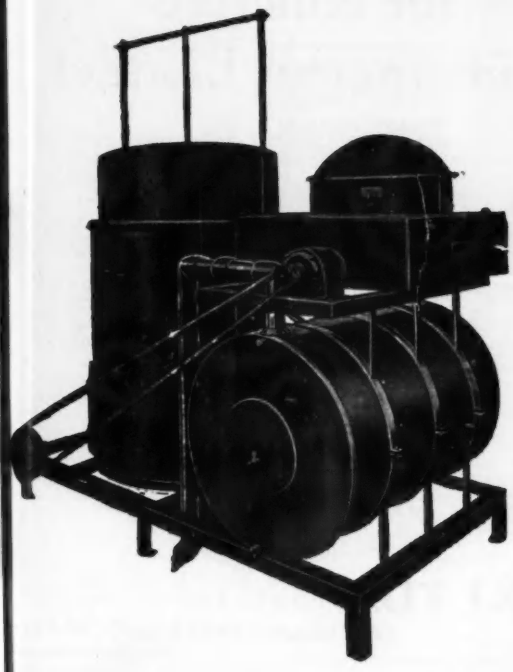

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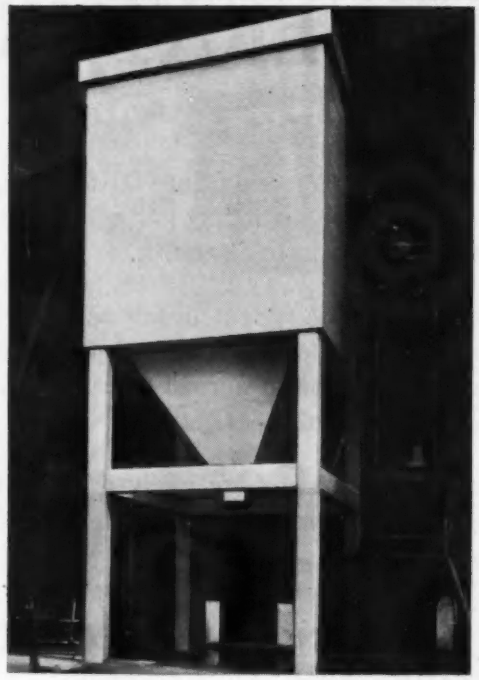

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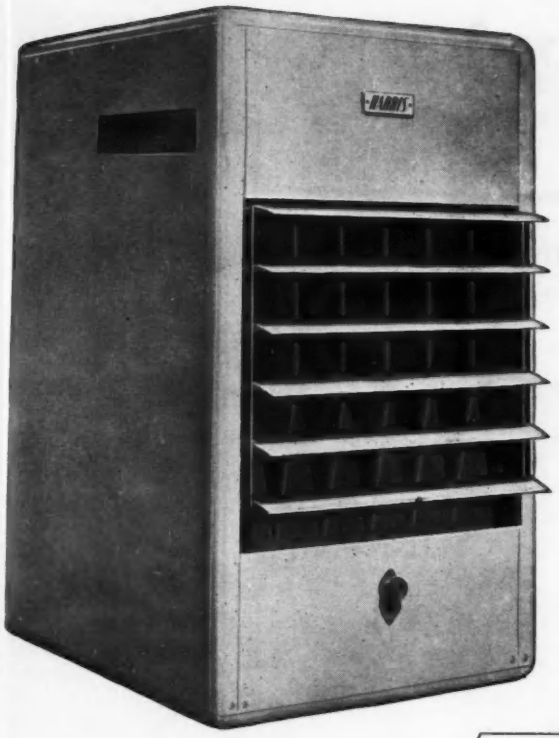

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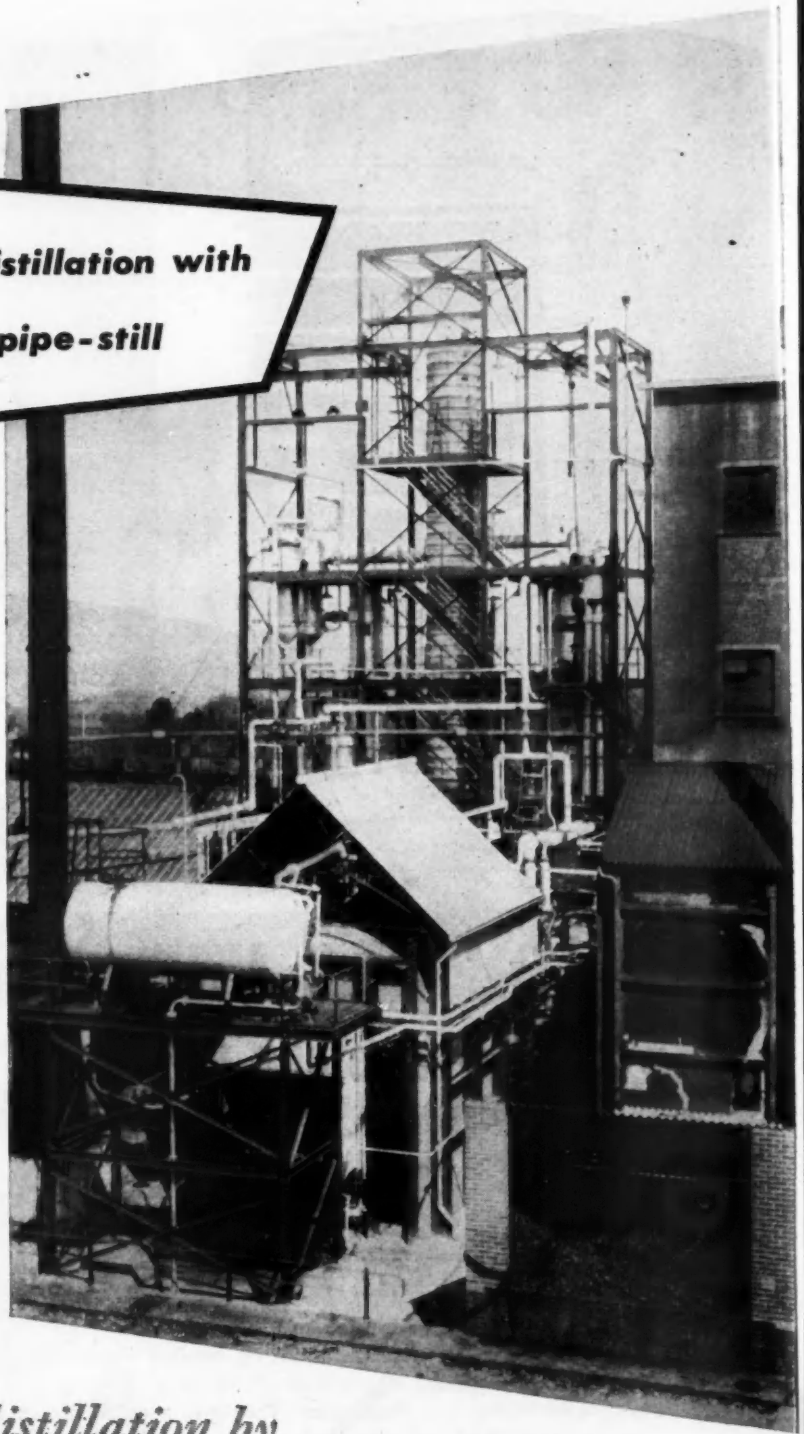

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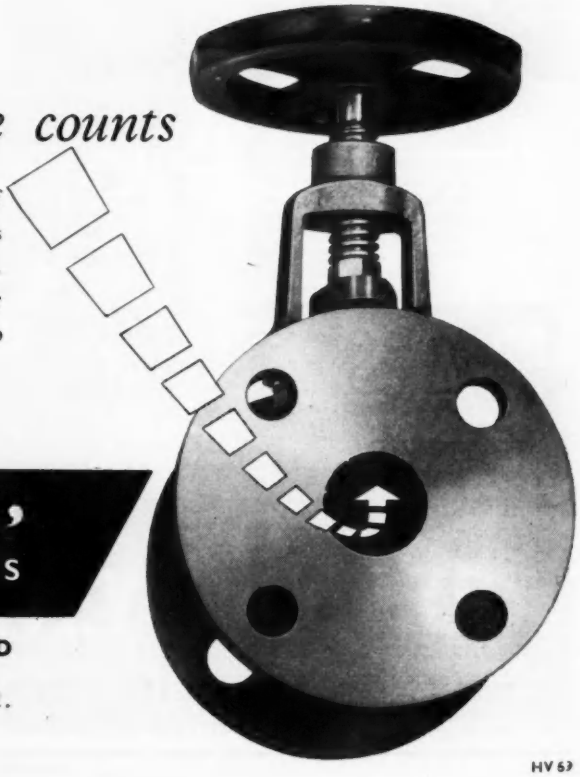

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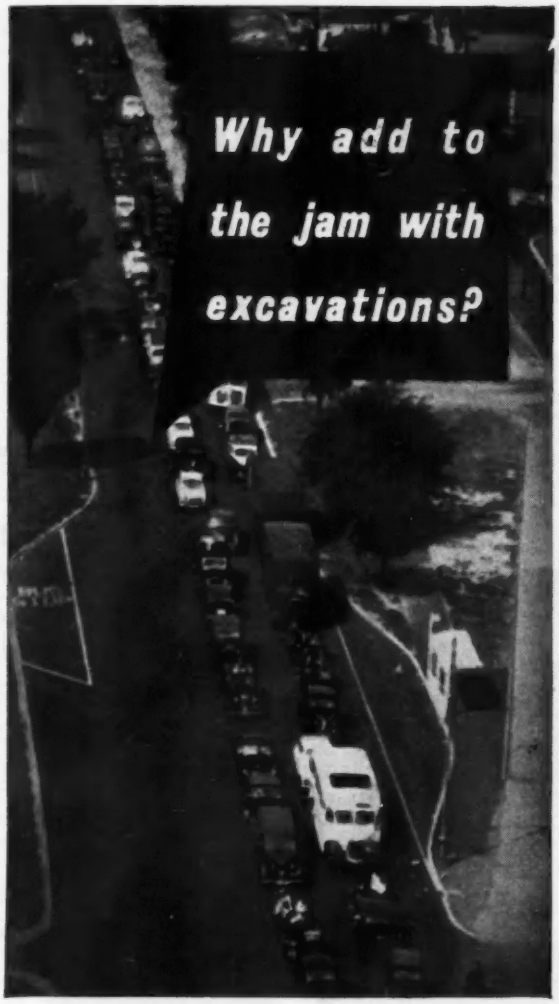

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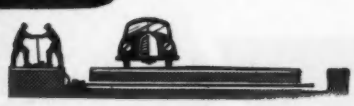

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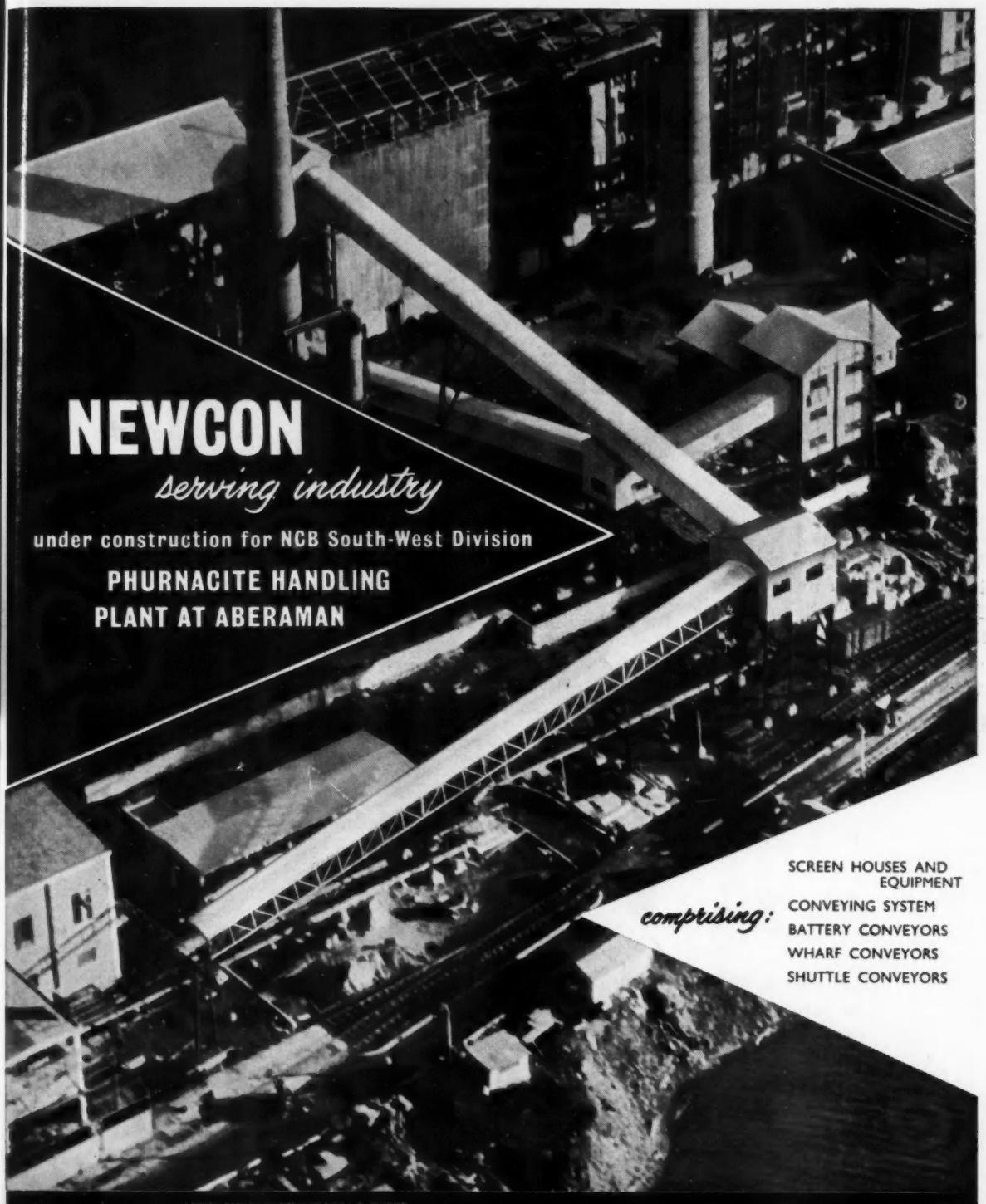

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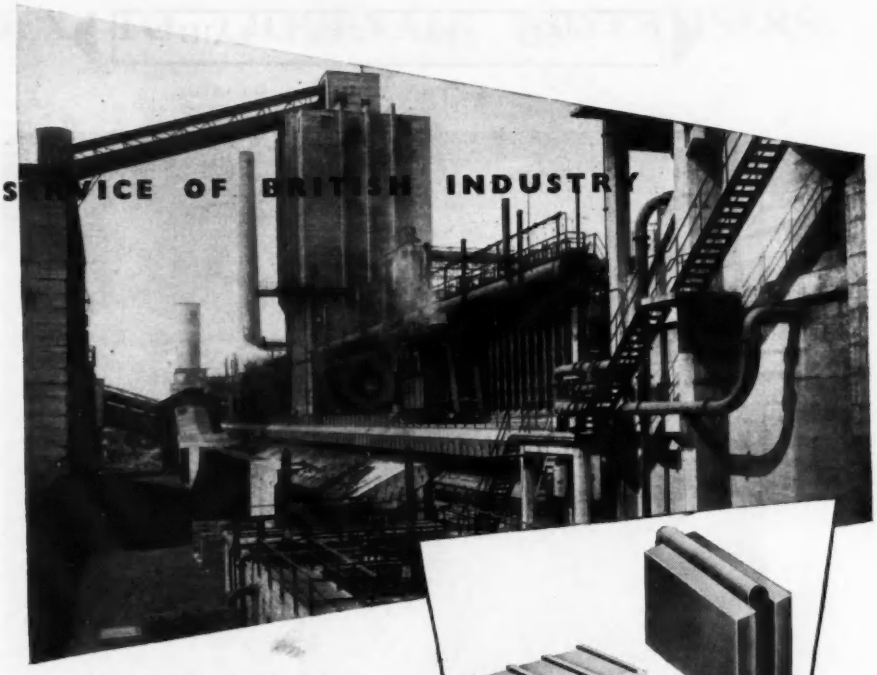

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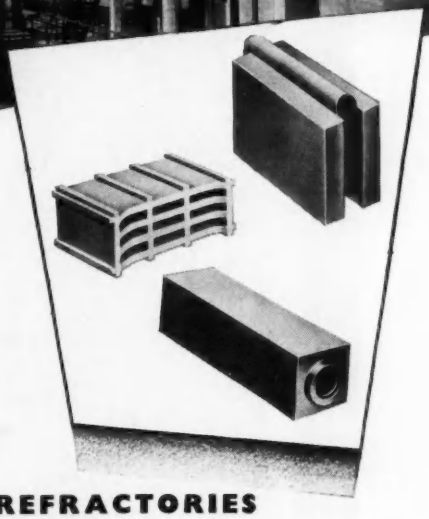

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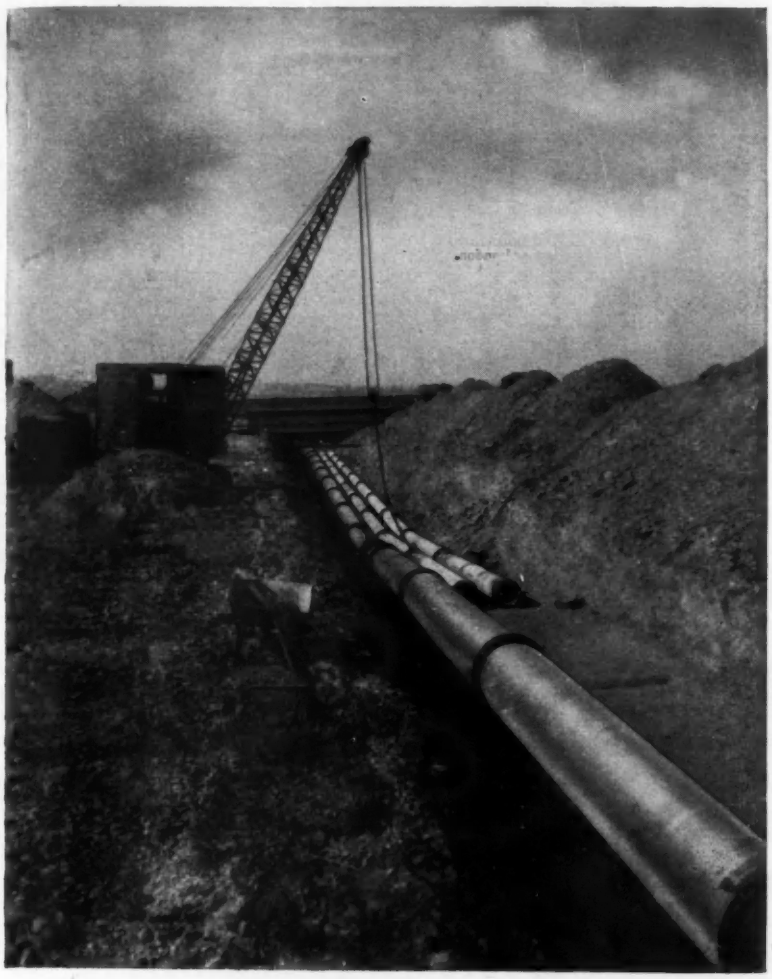

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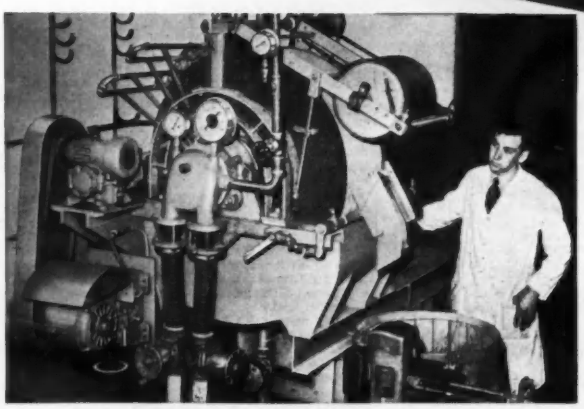

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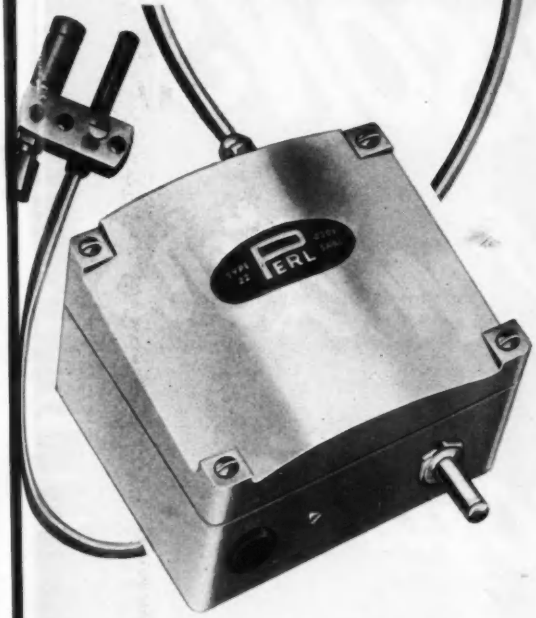

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Gas Journal

VOL. 287 NO. 4860 September 5, 1956

108TH YEAR

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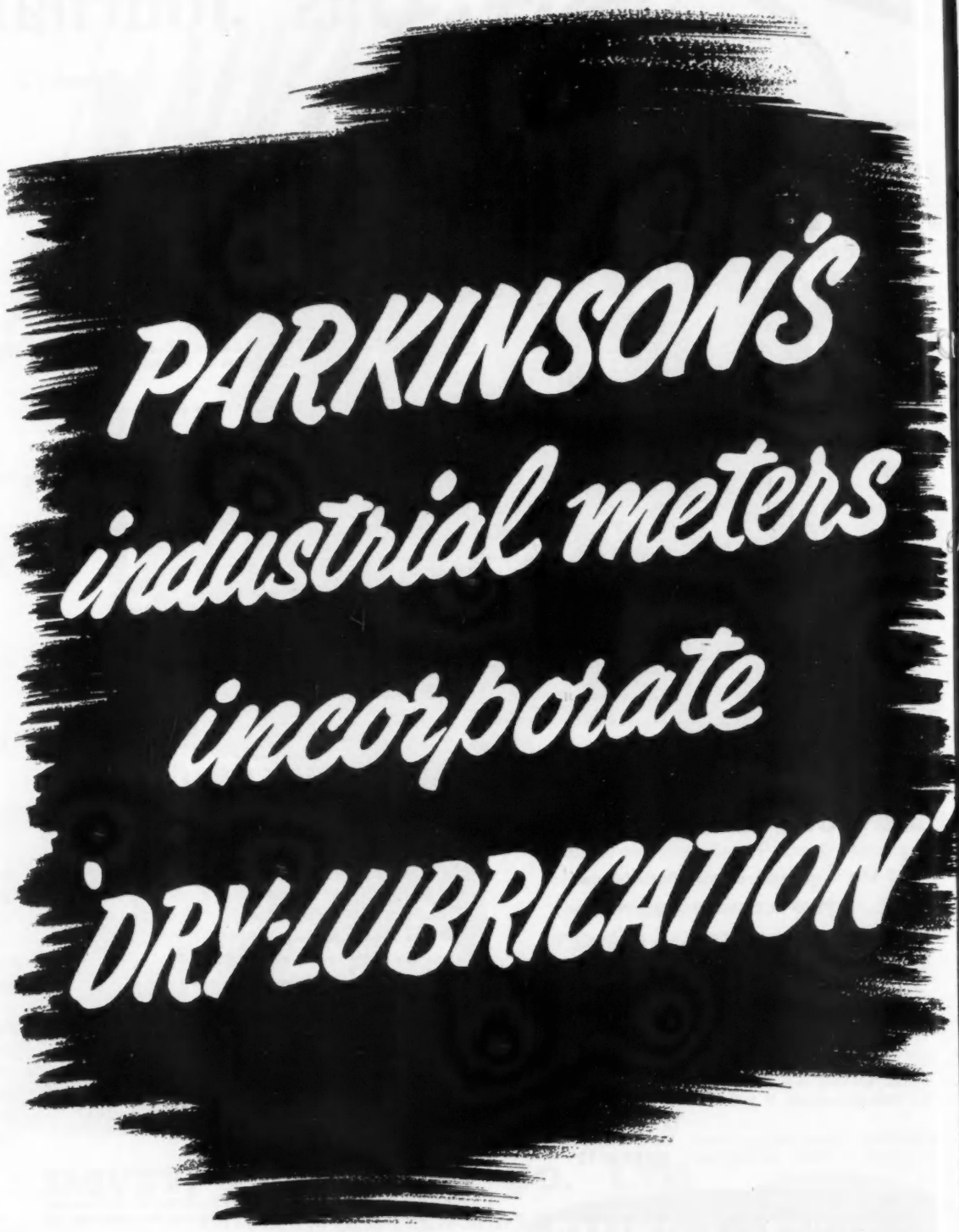
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Gas Journal

VOLUME 287. No. 4860. SEPTEMBER 5, 1956. 108th YEAR

Gas Behind the Iron Curtain

LAST week, in a leading article on the European gas economy, we referred briefly to gas in Eastern Europe and made the point that, in Czechoslovakia for instance, it was the Government's policy to adjust prices to make it possible to get rid of quantities of coke oven gas which had become available by expanding the gas industry. For the ultimate expansion of the industry in Eastern Europe, however, natural gas would be the chief source of supply. We only made a brief reference to the U.S.S.R. as the facts at our disposal were scanty. However, we have since gathered, from Russian journals concerned with the gas industry, that a great effort is being made to build up the industry on sound foundations and to speed up its expansion. The chief source of gas will, the Russians hope, be natural gas from the south in the oil-well area near the Caspian, and the basic plan appears to be to develop the consumption of gas in the more populous parts of Russia in Europe, in other words, Russia to the west of the Urals.

The first work of any magnitude will be the laying of a trunk main from Stavropol in the south—about 100 miles north of the Georgian border—to Moscow. As the crow flies the distance between these two places is about 800 miles but the route the main will follow will probably be considerably longer. This will bring natural gas up into North Western Russia. To prepare for the transport of what is described as 'unlimited' quantities of gas, the distribution systems of the large cities have been greatly expanded in the last few years. Thousands of kilometres of mains have been laid in Moscow and Leningrad in the north, in Kiev in the Ukraine and in Kuibishev, 550 miles south east of Moscow. In fact, the result of these activities is to increase supplies to private dwelling houses and industry by 2¾ and 3½ times respectively in the last few years, though compared with 1940, the combined increase has been about 40 times. It is calculated that about 9 mill. households now have gas connected, with a fuel saving of about 500 mill. roubles, and a great increase in standard of comfort. Gas is becoming indispensible, in fact between 1956 and 1960 gas will be connected to a further 132 towns, 58 of which are in South Russia.

As well as these cities, workers' settlements will also benefit by the increase in gas supplies made possible by the availability of natural gas—the Ministry of Communal Affairs in South Russia is seeing to it that full advantage is being taken of such resources. Such places as Rostov-on-Don and Taganrog, on the Sea of Azov, and Voronezh North West of Stalingrad, will be included. The whole of the Kuban area is to be intensively developed and a net work of trunk mains will effectively cover the area towards the Caspian.

This project, absolutely vast in its conception, is one of the most important of the sixth Five Year Plan, but this is not the only part of the Plan which concerns gas. Smaller projects are being put in hand to supply the metal and chemical industries in such towns as Magnitogorsk, 500 miles east of Moscow in the Urals, and Kemorovo, 1,200 miles further east in Siberia. Later on this will be extended to Irkutsk on Lake Baikal, 200 miles due north of the Mongolian border. The main source of supply for these areas will be from oil gasification plants.

Even when the apparent geographical difficulties of these vast schemes have been overcome, other serious problems present themselves. The Government, as part of this Five Year Plan, decided to connect gas to every dwelling in the Moscow suburbs, but it is pointed out that it would be quite impossible to do this without the full co-operation of the houseowners. In the past such beneficial schemes have failed because the owners have not co-operated. They have, therefore, had to do without the benefits and comforts of gas. Added to this, the shortage of plant has made the manufacture of gas by conventional carbonisation a very difficult matter in the past. But the discovery of large quantities of natural gas and its distribution and utilisation by industry on a

federal basis should overcome this difficulty. Coal gas, however, is going to be made use of wherever possible and large industrial plants equipped with blast furnaces and, presumably, coke ovens will contribute their share to the general production of gas for the transport systems. The production of gas from low grade coal is visualised and this will presumably involve the use of one or more of the processes of complete gasification, possibly the Lurgi process. Further efforts are to be made to make full use of light petroleum gases, and orders have been issued to manufacture for rail and road tankers to transport this type of fuel. In certain cities permission has been given by the local authorities to allow the building of containers in the kitchens of private houses to store these gases.

It is surprising that among the cities which are to have the natural gas in due course, are Moscow and Kiev. This is probably a matter of calorific value and the authorities hope that alterations to the appliances will not be necessary when natural gas is connected.

This Five Year Plan is having repercussions in other sections of industry too. Not only is the country short of the heavier equipment for gas distribution such as boosters, cast iron pipes of all dimensions, telemetering and cathodic anti-corrosion equipment, but also gas appliances. The Central Gas Board, however, is of the opinion that this shortage can be got over by encouraging local manufacturers to start manufacturing them, though it was somewhat of a blow when the Ministry in charge of the manufacture of such appliances announced its decision to reduce their production.

Throughout the Russian gas Press, stress is being laid on the benefits that the use of gas bestows on the housewife and the worker—presumably at work as well as away from it.

And North of the Border

INFORMATION about natural gas has almost exclusively come to us since the war from the United States. It is the U.S.A. which has pioneered the exploration, large-scale production and perhaps the most important of all, the extensive long-distance transportation of natural gas.

But in Canada, also, natural gas is to be found in large quantities—but not so far in amounts so great as in the U.S.A. Natural gas, in fact, has been known in Canada for a great many years, in such places as the township with the picturesque name of Medicine Hat in Alberta. The total area of Canada is greater than that of the U.S.A., but a large proportion of it is in the sparsely populated far north, since the bulk of the population of less than 20 mill. is in the southern half of the country. It was not until the long distance transportation of natural gas had been successfully accomplished that the expansion of the industry really developed in the United States, and it was not until then that further exploration for more and more sources of natural gas was pursued with drive and enthusiasm.

With its much larger population, 150 mill., or 47 per square mile compared with four per square mile in Canada, and its enormous production capacity, the U.S.A. has been able to take the vast capital expenditure of providing long distance pipe lines in its stride. But Canada has had to wait for the decision of the Federal Government to allow the building of the Trans-Canada pipe line and the provision of financial aid for the project. Now, however, a favourable decision has been arrived at and everything is set for the project to become a reality. In the *Canadian Gas Journal* last month a full account is given of the proceedings of the Canadian Gas Association's Convention at Murray Bay in the Province of Quebec. The main theme of the Convention is natural gas, its exploitation, and the effect it will have on the gas industry in Canada as a whole.

It seems that in countries like Canada, it is very hard to carry on an industry for the production and distribution of manufactured gas. Gas has to compete with its well-known opponents, electricity and oil, especially in a cold country where central heating centrally controlled is demanded in the big cities and where the concentration of population would give a good enough load factor to justify an extensive distribution system and large production units. The distance of these from the sources of raw materials is great. We gather, therefore, from the points discussed, that the laying of the Trans-Canada pipe line will not only revolutionise the Canadian gas industry by bringing gas to a much wider and greater number of potential consumers, but it will also inject new life into the present industry by substituting natural gas for manufactured gas and—eventually—completely supplant it.

The conference was also addressed by members of the American Gas Association, who were vigorous and outspoken in their opinions about the great future which the Canadian gas industry had before it. One speaker, however, Mr. I. M. De Bard, Vice-President of the Stone and Webster Service Corporation, New York, stressed that the real success of the gas industry anywhere, especially when expansion was the main object, was what he described as the 'tripod of success,' the three legs of which are the utilities, the manufacturers, and the dealers. For the tripod to remain a stable structure, each leg must be equally strong and be capable of carrying its own share of the weight. If any leg weakens and the tripod sags, Mr. De Bard said, the future would be dim indeed. The Canadians themselves seem well aware of this and Mr. F. R. Palin, the President of the Canadian Gas Association for 1956, was emphatic in pointing out that now gas was becoming available, members of the Association must go all out to find new outlets for gas to justify the expense of the long distance supply mains and of the great outlay necessary to expand the local networks.

The Conference was also addressed by Mr. Dean H. Mitchell, of New York, who is President of the American Gas Association for 1956. He was extremely critical of the way in which Trans Canada Pipe, Ltd., had been financed. The very fact that the Federal Government were assisting by finding the capital was, Mr. Mitchell thought, 'a shame to a free enterpriser,' and 'when you purchase your gas, you are no longer autonomous,' and finally, 'there would be the long hand of Government regulation reaching into factors affecting cost and the quantity you supply.'

In spite of these gloomy prognostications and others affecting relations between suppliers, transporters and distributors—problems very real in the U.S.A.—the enthusiasm of the Conference refused to be damped or diverted from its great purpose of carrying out a great service to the Canadian public.

Personal Notes

MR. F. E. STARKEY, Assistant Chief Accountant to the Wales Gas Board since 1949, has been appointed Accountant to the Liverpool Group of the North Western Gas Board. Mr. Starkey is an Associate of the Chartered Institute of

Mr. F. E. Starkey

Secretaries, an Associate of the Association of Certified Corporate Accountants and an Associate of the Institute of Cost and Works Accountants. He began work as a junior clerk with the Liverpool Gas Company in 1928 and became Cost Accountant in 1946, and Joint Chief Accountant in 1948. When the gas industry was nationalised, Mr. Starkey was appointed Assistant Chief Accountant to the Wales Gas Board.

MR. J. R. PORTER, Works Manager of Redheugh gasworks, Gateshead-on-Tyne, has retired after 51 years in the gas industry, and has been succeeded by MR. J. C. GRAHAM, who has been Assistant Manager since 1941. Mr. Porter was formerly gasworks Manager at South Shields and Jarrow. He is a former Chairman of the auxiliary section of the North of England Gas Managers' Association. The Redheugh staff and employees have presented Mr. Porter with a silver tea service, electric razor and golf caddy car. Mr. Graham, who is 44 years old, started his career with the old Newcastle and Gateshead Gas Company when he was 17. He is this year's President of the Northern Junior Gas Association.

MR. F. W. CHAPMAN and MR. G. F. JENKINS have been elected to the Board of Directors of Main Water Heaters, Ltd. Mr. Chapman has become Managing Director and Mr. Jenkins will continue in his capacity as Sales Manager.

MR. JAMES LEAVER, Divisional Comptroller, was appointed to the Board of the Parkinson Stove Co., Ltd., and Monitor Engineering and Oil Appliances, Ltd., both subsidiaries of the Parkinson Cowan group of companies. z

MR. E. J. DAVIES, Deputy Marketing Director of the South Western Division of the National Coal Board, has been appointed Divisional Marketing Director. He succeeds the late Mr. P. R. Evans.

MR. DAVID H. G. INCE, D.F.C., has joined British Oxygen Arc Equipment, Ltd., as Sales Manager.

MR. W. HYDE has been appointed Chief Accountant to the Southern Gas Board as from September 1, in succession to MR. W. H. HADDLETON.

MR. A. G. DE Q. COLLEY, who 10 years ago left the Parkinson Stove Co., Ltd., Stechford, where he was General Manager and Director, to form the Thermionic Group of Companies at Hythe, Southampton, died suddenly while on business at Kiel, Germany. He was 47. Mr. Colley was Chairman and Managing Director of Thermionic Products, Ltd. He joined the Parkinson Stove Co., Ltd., in 1936 as General Manager, later becoming a Director of the Company and of its sister Company, Monitor Engineering and Oil Appliances, Ltd. During the war he commanded the 39th Battalion (Warwickshire) Home Guard. He was a keen yachtsman, and frequently used his own 'plane for business trips abroad. He was cremated in Germany, a memorial service being held at Perry Barr Crematorium, Birmingham, on August 31. Mr. Colley leaves a wife, son and daughter.

SIR ERNEST SMITH, C.B.E., who has been Chairman of the Industrial Coal Consumers' Council since its formation in 1947, has been reappointed to that office. MR. DOUGLAS CORY-WRIGHT, Deputy-Chairman of Wm. Cory & Son, Ltd., has been appointed Deputy-Chairman of the Council. ALDERMAN MRS. F. H. CANTWELL, O.B.E., who has been Chairman of the Domestic Coal Consumers' Council since 1950, and MRS. R. BEALE, O.B.E., the Deputy-Chairman, have also been reappointed.

MR. DOUGLAS SCOTT has been appointed Northern Sales Manager for the Northern, North Eastern, North Western and West Midlands Gas Board areas for Smith Meters, Ltd. Mr. Scott, who has been connected with the gas industry for many years, formerly represented T. Glover & Co., Ltd., in the North. He has taken up office at 3-4, East Parade, Leeds, 1. Mr. Phil Wallis has been appointed Southern Sales Manager, covering sales in the Eastern, East Midlands, Southern and South Western Board areas.

MR. HENRY JAMES MITCHAM, of Taunton, Somerset, has retired from the South Western Gas Board at the age of 65. Mr. Mitcham has worked for the old Taunton Gas Company and the Gas Board for 50 years. His father had been employed by the company for 40 years. Both were gas fitters.

MR. R. E. GEORGE, Chief Personnel Assistant, South Western Gas Board, has been awarded the Degree of Master of Arts at the University of Bristol. His thesis was entitled 'The Marginal Theory of Pricing and the Gas Industry.'

MR. E. V. CORPS, Exploration Manager, Pakistan Petroleum, Ltd., retires this month after 26 years of oil industry service in the East. He leaves Karachi for the U.K. on September 11. Mr. Corps has been actively concerned in the exploration, production and development of petroleum resources in many different parts of the sub-continent. In Pakistan alone he has seen the discovery and development of the Sui field, whose gas resources are now a major factor in the industrial development of Pakistan; the successful development of Pakistan Petroleum, Ltd.'s Balkassar oilfield, an ever-expanding search by geological and geophysical methods for more oil possibilities, and past and present prospecting operations by the drill at test wells in Sylhet, Karachi and Khairpur.

Diary

September 10.—NORTHERN G.C.C., 30, Grainger Street, Newcastle upon Tyne, 11.15 a.m.

September 19.—SCOTTISH ASSOCIATION OF GAS MANAGERS: Golf Circle A.G.M., Curling Hall Hotel, Largs, 5.30 for 5.45 p.m.

September 21.—MANCHESTER AND DISTRICT SECTION, I.G.E.: Visit to the Works of W. J. Jenkins & Co. Ltd., Retford, Notts.

September 22.—EASTERN JUNIOR GAS ASSOCIATION: Presidential Meeting, George Hotel, Colchester, 11 a.m.

September 24.—WEST MIDLANDS G.C.C.: Committee Room 'C', City of Birmingham Education Department, Council House, Margaret Street, Birmingham 3. 2.30 p.m.

September 26.—NORTH WESTERN FUEL LUNCHEON CLUB: Opening session.

October 2.—SOUTH EASTERN G.C.C.: 11 a.m.

October 3.—INCORPORATED PLANT ENGINEERS: Polygon Hotel, Southampton, 7.30 p.m.

October 4.—WALES AND MONMOUTHSHIRE SECTION, I.G.E.: 10.30 a.m.

October 9.—INCORPORATED PLANT ENGINEERS: Engineers' Club, Albert Square, Manchester, 7.15 p.m.

October 10. — INCORPORATED PLANT ENGINEERS: Sherwood Room, County Hotel, Theatre Square, Nottingham, 7 p.m.

October 11. — INCORPORATED PLANT ENGINEERS: Scottish Building Centre, 425-427, Sauchiehall Street, Glasgow, 7.15 p.m.

Gasworks for Sale

Magherafelt (Co. Londonderry) gasworks, including a dwelling house, are to be sold by public auction in the near future. Established more than 100 years ago the works closed down last year when the town's gas users changed from coal to butane gas.

D

Unanimity at Trades Union Congress?

WAGE RESTRAINT PLEA IGNORED

THE Trades Union Congress began on Monday of this week with remarkable unanimity on most of its domestic front at least. It had been responsibly anticipated that Mr. Macmillan's call for wage restraint just before the Conference would be carefully ignored, partly, one theory had it, as a result of resentment over the lack of measures designed to thwart over-large executive expense accounts and partly merely because of the Chancellor's timing of his plea which, some felt, was designed to place the Unions in the wrong in the battle against inflation.

On p. 559 of this issue a subject which is preoccupying many of the unions proposing resolutions at the Congress—automation—is dealt with in full by our Industrial Relations Correspondent.

Militant

Some resolutions on this subject take a militant form demanding, for example, 'immediate discussion between employers and the trade unions,' and 'an all round cut in the working week without loss of wages,' while others take a longer view and call for the establishment of a permanent commission to enquire, in one case, into 'the economic, social, technical, educational and cultural needs and consequences.' The Civil Service Clerical Association proposes that greater mobility of labour is required and calls on the Government to play a constructive part by 'amending its housing policy so that transferred workers may secure houses to rent at a figure they can afford.'

A remarkable resolution is proposed by the Amalgamated Engineering Union which asks Congress to deplore the position that has arisen in nationalised industries where, 'although the industry is paying its way, due to external charges the accounts show a loss, instructs the General Council to pursue . . . that interest charges and losses sustained through importing should be a national charge, and not charged up to the industry concerned and, further, that industrial users of coal should be charged the same rate as domestic users.'

The General Council's Report covering as usual, among other things, the multitudinous aspects of British industry touches upon, without comment, fuel and power, merely remarking that electricity supplies in the last year continued to rise, while gas production fell slightly. The General Council noted with interest the experiments taking place with underground gasification of coal.

1929 President Celebrates

Mr. Charles Stuart Shapley, for 31 years Engineer and General Manager of the Leeds Gas Department, and Mrs. Shapley celebrated their golden wedding anniversary at their home, Roman Way, Alwoodley Lane, Leeds, last Saturday, September 1. Mr. and Mrs. Shapley are Devonians and were married at the Parish Church of Churston Ferrers, Devon, on September 1, 1906.

When Mr. Shapley retired from the Leeds Gas Department, a few months before nationalisation, he had spent almost 50 years in the gas industry. In 1929 he received one of the highest honours the industry could bestow by his election as President of the newly Chartered Institution of Gas Engineers and he presided over the Institution's annual general meeting in Leeds the following year.

Mr. Shapley, who is 72, is a former Chairman of the West Riding District Executive Board of the National Gas Council and of the West Riding Joint Regional Industrial Council. He is still a member of the Institution of Gas Engineers.

British Association

AUTOMATION PROSPECTS

Total Labour Costs Reduced

MR. J. F. COALES, of the Engineering Laboratory, Cambridge University, told a joint session of the Economics and Engineering sections of the British Association: 'Automation should enable the productivity of the country as a whole to go on increasing for many years to come without increase in the labour force which must result in at least some improvement in the general standard of living.'

'Evolution'

Automation, he declared, was no more than the evolution of improved methods of replacing human and animal labour by energy from natural sources and the development of tools to control these processes in order to relieve the operators of the burden of watching them or of making calculations and adjustments.

The replacement of physical labour by machines had been going on continuously throughout the centuries, first by the use of gravity, water and wind power and later by the use of solid fuels and now by the use of nuclear power.

SCHOOL MEALS SERVICE—

Gas Council Brochure

NOW that the serving of a mid-day meal is standard practice in schools throughout the country, and the majority of schools incorporate a kitchen as part of the school buildings, it is essential for efficient and economical appliances to be installed.

The speed and flexibility of gas appliances are well known to all users of large kitchens, together with the facilities they provide for the cooking and service of good food.

'Gas and the School Meals Service,' a new brochure issued by the Gas Council, describes the size and type of apparatus recommended for schools of varying numbers of pupils, advises on kitchen layout with the aid of diagramatic plans, and includes a wide range of photographs illustrating striking examples of kitchens in various parts of the country.

Members of local authorities, architects and all concerned with education will find this booklet of great interest.

Four July Gas Strikes In Alberta

JULY saw a great increase in activity in Western Canada's gas and oil areas with four gas strikes in Alberta during the month. The increase can be judged by the fact that 304 rotary rigs are either in the process of drilling or moving to new locations for drilling; this number is seven greater than the previous record.

Saskatchewan, Alberta, British Columbia, and Manitoba are also busy with 89, 185, 18, and eight active rigs respectively. Showings in the Saskatchewan area are better than ever before.

Two of the main factors encouraging the increased activity are the high ratio of completions in developmental and wildcat drilling, and the approaching termination dates for many of the freehold exploratory leases.

GAS HEATING IN MARKET PLACE?

Subject to approval of Halifax Town Council on Wednesday, September 5, the Markets and Parks Committee is proposing to install a gas radian heating system, at an estimated cost of £3,000, in Halifax market. This move follows complaints about the cold in the market.

MYSTERY OF THE PIPELESS 'GAS VALVE'

CURIO FOUND IN OLD HOUSE

WHEN a South Shields resident modernised an old house he had just bought, he removed a piece of apparatus from a wall in the lobby which a gas inspector said was 'unlike anything I have seen in 43 years' experience.'

A photograph of the extraordinary apparatus was sent to the 'GAS JOURNAL' to see if our 107-year-old records could clear up the mystery. Our search proved unsuccessful.

But, as the dial on the apparatus was inscribed 'Carnaby & Co., 91, Pitt Street, Liverpool,' we asked Mr. S. A. Harris, of the Liverpool Group, North Western Gas Board, to help. He is a keen amateur antiquarian and local historian.

And, sure enough Mr. Harris knew, or at least, found out what the object was.

Letters Patent

In 1852, it seems, Letters Patent No. 452 was taken out covering apparatus for regulating the main taps of gas pipes laid on to houses from a part of the house away from the main tap.

A chain lifted the main tap in opposition to a weight which would move the tap in the opposite direction to close it.

Dated October 20, 1852, the Letters Patent was sealed on January 19, 1853, and was granted to one John Carnaby, of 130, St. John Street, Clerkenwell, Middlesex. The first mention of him in Liverpool is in a directory of 1871, where he had established himself as a maker of gas apparatus at 91, Pitt Street. In 1897 he had extended his activities and the firm had become 'gas apparatus manufacturers and electricians.'

In 1903 the firm had moved to St. James' Place in Liverpool and, after two further moves, seems to have disappeared in 1934 as that is the last directory entry.

What Purpose?

What purpose did the 'valve' serve? Perhaps the idea was put to large-house owners that they needed an easier means of cutting off the gas if there was a fire than going into the basement, where the mains tap was invariably placed.

Or was it to vary the gas to a vast gasolier? Or to reduce the pressure throughout the house to save money or prevent the domestic staff burning the midnight gas? We should certainly like to hear from anyone who has the answer.

Whatever it was for, however, it seems clumsy compared with present electronic remote control systems.

A photograph of the mysterious apparatus.

Printer's Year Book

The Modern Printer's Year Book and Directory of Supplies, 1956 edition, is now available, price 4s. 6d., from Bendles (Torquay) Ltd., 15-16, George Street, Torquay. It will be found that this book is remarkably good value for the money, not only being intended for printers, but also for anyone who ever has to submit specific print orders.

S.E. GAS BOARD MEET SURREY TEACHERS

1-Day Conference

The South Eastern Gas Board recently held a conference for the Association of Teachers of Domestic Science, Surrey. It was held at the Selsdon Park Hotel, and one hundred domestic science teachers attended.

Display of Appliances

A large display of the latest gas appliances was staged in the lecture room. Mr. G. H. Fuidge, Chief Physicist to the Board, spoke on developments in modern gas appliances, and this was followed by questions and discussion. Later, a demonstration was given by M. Jean Conil, the French chef, using two cookers and a refrigerator.

The Chair was taken by Mr. A. M. Munns, Sales and Service Manager, East Surrey Division. Others present included Mr. F. E. Salter, Assistant Sales and Service Manager, West Surrey Division. Mrs. Mair Jones, Chief Home Service Adviser, and the Divisional Home Service Advisers from the Board's four London Divisions, Mrs. A. Piggott (East Surrey), Miss S. Cruttenden (West Surrey), Miss J. Lyons (Metropolitan) and Miss E. Gray (Kent Suburban).

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Clean Air Act Summary

The Clean Air Act, which went on to the Statute Book on July 4, has 37 sections and four schedules. But the National Smoke Abatement Society has just published a 12-page summary of the Act adequate for general reference.

The booklet is available from the Society at Palace Chambers, Bridge Street, London, S.W.1, at 6d. for single copies, or 4s. 6d. a dozen, postage included.

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NORTHERN MINIMUM CHARGE—CRITICS ANSWERED

THE Northern Gas Board has replied to criticism of its decision to introduce a minimum quarterly charge for gas consumers.

It has been complained that, under the plan, some householders who use only a very small amount of gas have to pay for gas they have not consumed.

The Gas Board pointed out that a considerable amount of money was spent equipping houses with pipes and meters, and to employ someone to read the meters and collect money.

Where only a little gas was used, the revenue was swallowed up by the costs of providing supply equipment, leaving nothing to cover the cost of making the gas. The minimum charge was to help pay the cost of seeing that a supply of gas was always available at the premises.

The Board's statement cited as an example the water rate, on which no rebate was paid, even if a house was closed for a month or two. The water was available, and the full charge had to be paid.

KING'S LYNN 'INTERNATIONAL KITCHEN'

A small scale 'international kitchen' was a feature of the recent King's Lynn Festival. Four countries, China, Italy, Netherlands and Portugal demonstrated their national dishes in attractive kitchens erected by the Eastern Gas Board. The demonstrators were members of the International Kitchen Club formed as an outcome of the Gas Council exhibitions at the Royal Festival Hall and at Olympia.

The Queen Mother, who was Patron of the Festival, visited the kitchens and talked to the demonstrators, tasting Italy's *zabaglione*.

Among those presented to the Queen Mother were Mr. R. A. Weston, General Manager of the Norwich Division, Eastern Gas Board, and Mr. L. C. B. Williams, King's Lynn Group Manager.

Some Birmingham Gas Lamps May Go Out

IF STRIKE GOES ON

MANY gas lamps in parts of Birmingham which are not being wound up and set because of an unofficial strike by 36 of the city's 170 street lamp attendants are to be adjusted to burn for 24 hours a day.

This will be done on bus routes and at danger points. But if the strike continues for some time lamps in other areas will go out and will remain unlit.

The strike began on August 22 at three of the city's 12 lighting depôts in protest against new working schedules. Of the 37 men who stopped work only one returned after appeals to do so by union officials and the Chairman of the Public Works Committee, Councillor F. Price.

The three depôts involved are those at Walsall Road, Saltley and Erdington.

The men's spokesman, Mr. Denis Bagley, said that the men had stopped work because the management was trying a scheme which eliminated 25 vacancies—'a scheme which is designed to create unemployment.'

Councillor Price said he had told the men the Corporation intended to operate a policy of electrification because of the vast savings involved.

'We have emphasised all along and I emphasised at the meeting on August 22, that the thing we wanted to avoid was redundancy,' he said.

'It was not the case that we wanted to create unemployment. We just wanted to see to it that vacancies were not filled so that when we do bring into operation full electrification of the street lighting there would be no mass sackings,' he added.

UNDERGROUND GAS STORAGE—N.G.B. TO BEGIN WORK

IN the discussion of Dr. Gummerts's Paper on 'Problems of Long Distance Transmission of Gas in Germany' at the Institution Meeting in May mention was made of the possibilities of using certain underground strata for the storage of manufactured gas.

Difficulties to be overcome included the blockage of the pores of the strata by unsaturated hydrocarbons.

The Northern Gas Board have been carrying out experiments and investigating the possibilities of underground storage in County Durham and announce that the many legal difficulties have been overcome and work can now begin at the site chosen.

Drilling operations should start in about a fortnight's time.

Minister at the Food Fair

Mr. Heathcoat Amory, Minister of Agriculture, who opened the British Food Fair at Olympia, London, touring the Gas Council exhibit. He is seen at the West Midlands Gas Board's kitchen—he is, in fact, M.P. for a West Midlands constituency. Centre is Mrs. Eileen Murphy, Home Service Officer of the Gas Council, who organised the demonstrations in the 12 kitchens. The Food Fair remains open until September 15.

NEWS IN BRIEF

'KEEP it Clean'—a Gas Council film on food hygiene—was used in a recent health education drive among school-children at Harrow. 'The children enjoyed the film immensely,' said Mr. S. N. King, Harrow's Chief Sanitary Inspector. The film has been screened 474 times since March and has been seen by nearly 34,000 people, including 10,000 schoolchildren.

Laboratory furnishers who are members of the British Laboratory Ware Association stabilised prices of their equipment and apparatus for six months from September 1 'subject to the costs of materials and wage rates remaining stable.'

A Supplement to the Directory of the Association of British Chemical Manufacturers, 1955, is available from Cecil Chambers, 86, Strand, London, W.C.2.

An 'Envoy' cooker, by Flavels of Leamington, was won by Mr. and Mrs. Dunlop, Gloucester, on a recent 'Hit The Limit' programme produced by Associated Television, Ltd. The cooker had been displayed for three weeks as no previous competitor had 'hit the jackpot.'

100-YEARS-OLD GASWORKS CLOSED DOWN

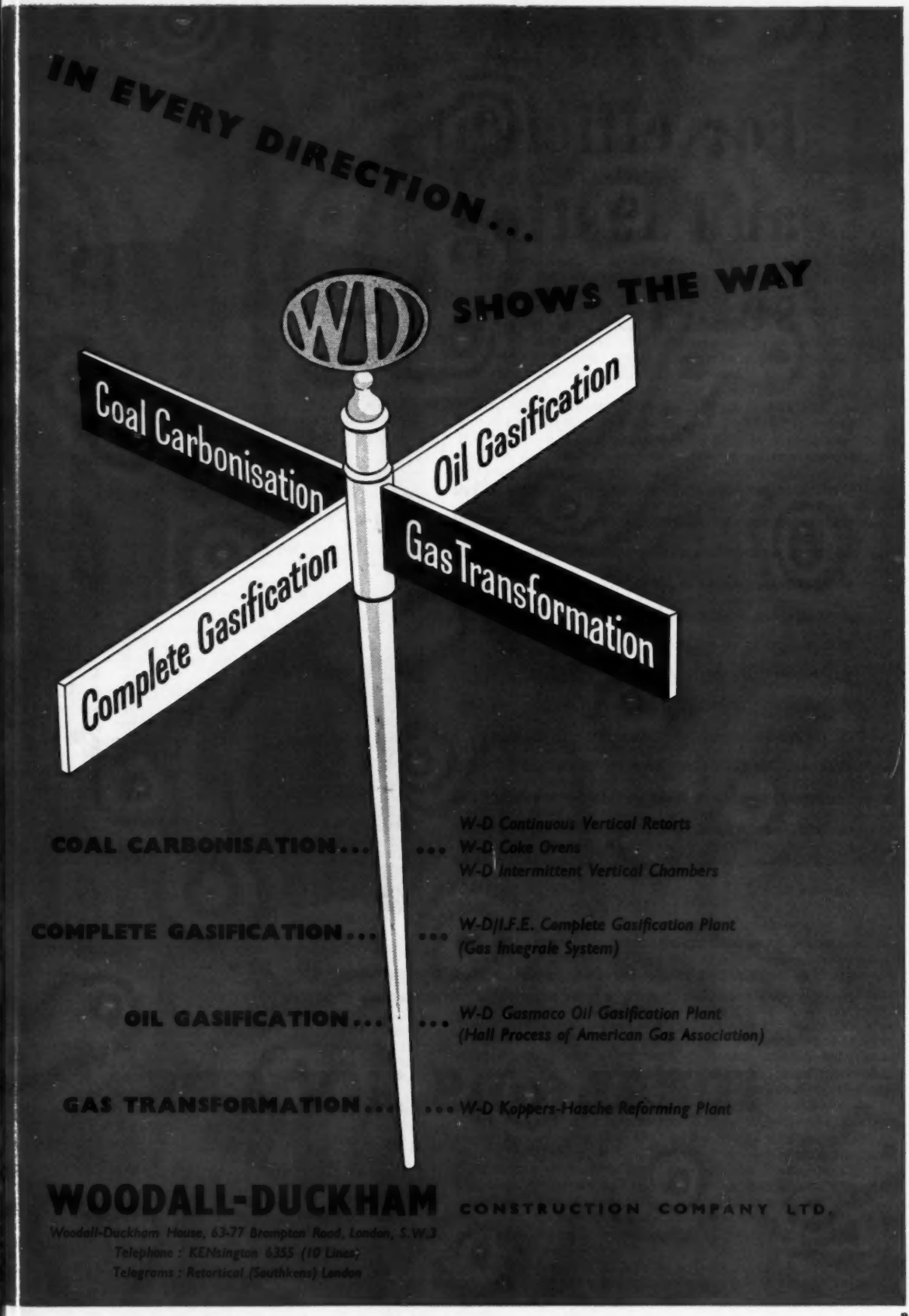
Built over 100 years ago, the Axminster gasworks has been closed down as a production unit, and in future gas will be supplied by a high-pressure main. Employees have been offered jobs elsewhere.

Mr. H. S. Moore, Manager of the Axminster unit of the South Western Gas Board, opened the new valve which is to supply the town. The pressure of gas, he said, would be the same as in the past, and although the furnace house and yard would most likely be sold, the gasholders would be retained as storage units. Coke would now be supplied from Exeter.

New Telephone System

To keep pace with ever-growing demands, one of the latest types of Strowger private automatic branch exchanges, designed to cater for some 450 telephone extensions and equipped with over 180 public exchange lines, has been installed at Fanum House, London headquarters of the Automobile Association by Automatic Telephone & Electric Co. Ltd., in colaboration with the Post Office.

The new exchange, which cost over £40,000 to manufacture and install, has 14 manual positions, and is linked by private lines with A.A. offices and depôts throughout the Home Counties.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The Bogey of Automation

Could Be Laid by Joint Consultation

WRITES OUR

LABOUR RELATIONS CORRESPONDENT

IT would appear that humanity must always have a bogey; otherwise, to use an Irishism, it is not happy. And once a bogey has been found, it always seems inevitable that it should be magnified and enlarged by the ignorant and the unenlightened. In primitive times, those with vested interests in sensationalism and rumour-mongering—the soothsayers and the medicine-men—lent their active aid to wild exaggerations. Today, they speak through the media of the less responsible examples of the popular daily and Sunday Press.

It is refreshing, therefore, to find a body like the Trades Union Congress devoting a whole Appendix in their Council's Report of 1956 to a statesmanlike and objective treatment of the subject of automation.

Not New

Despite all the babblings in certain quarters, automation is not new. It is as old as, if not older than, the Industrial Revolution. As soon as man discovered a contraption such as the windmill to do a job for him which did not entail his own active participation in the actual process, he had started on the road of automation. And, of course, as soon as he had done that, he gave rise to all sorts of corollary problems such as the capital cost involved, the saving and displacement of labour, the additional return in remuneration, the acquisition of a new skill in maintenance of the contraption, and the like.

No doubt, when he and his contemporaries saw the wind doing the work of more than one man, and doing it more efficiently and consistently, they were thrilled. But it is doubtful whether they lost their heads, as so many foolish people do today, and went about moaning and filled with fantastically gloomy prognostications as to the ultimate fate of the employee.

Need for Objective Examination

We do know, however, what is the ultimate fate of those who would deny and hinder progress. They remain primitive with primitive conditions of life, and with a very precarious hold on their means of livelihood. The very lowest of menials today in this country leads an aristocratic life compared with the life of the richest in the Early Middle Ages. Let us all, therefore, cease to dramatise the issue and consider the problem dispassionately and constructively.

What is automation? There have been many attempts at definition, but let us be content with that contained in the T.U.C. Report as that of a merging of three main streams of technical progress—automatic machinery (*i.e.*, transfer devices linking machine tools in automatic production lines and automatic handling of materials and products and automatic assembling of components); automatic process control (*i.e.*, as the name implies, automatic control over manufacturing processes); and lastly, automatic processing of data (*i.e.*, by electronic digital computers, processing technical and business information).

Inevitable

Its advent is inevitable in a highly industrialised country like ours competing in overseas markets. Why? Because, as the T.U.C. Report points out, industry basically serves the needs of the community; and if the community needs and wants change, then industry must adapt itself accordingly. And will our community want it? Of course, it will; for, if other countries like the U.S.A., Japan, Germany, and Russia adopt automation—as they undoubtedly are doing—and we do not, then we shall surely but slowly be squeezed out of the international market, and we shall literally starve. The Welfare State will have nothing in its coffers. The community would soon make short shrift of those dense or malicious employers and trade union leaders who would bring it to that state.

But is universal and wholesale automation on our doorstep? Of course it is not. Many factors have to be weighed and considered before it can be introduced. In the first place, it is very costly. Large capital has to be found to instal it on any substantial basis. Then careful calculation and planning have to be made in order to ascertain whether it is feasible—it is not practicable to apply it universally in mining, quarrying, forestry, agriculture, entertainment—and whether there will be adequate return on such outlay of capital.

The necessary type of labour, too, must be available. There is in this country at the present time a grievous shortage of scientists and of skilled managerial and technical personnel. The T.U.C. Report mentions that in 1954 this country produced for every million of its population 57 university graduates, whereas U.S.A. and Russia produced 136 and 280 respectively.

To remedy this weakness in our personnel position will take time; for education is a slow process which cannot be rushed unless it is to become farcical. A new type of operative will be needed. What will be required of him will be knowledge of plant and equipment rather than skill in one particular type of craft. He will not 'see' his job as he now does; he will determine its progress by the readings on instruments; and he will be required to understand and interpret those readings, for they, rather than personal observation, will be his guide. And these 'perceptual' and 'conceptual' qualities will have to reside in a man who is both able and reliable. For mistakes will be expensive as never before, and a careless or indifferent or incompetent operative will have to go as the intolerable luxury he would be. This does not mean advanced technical education since, as the T.U.C. Report suggests, there is no indication as yet that the new skilled demands are beyond the ability of most experienced workers. But it will involve them in some new training and education.

Mixed Feelings

Like all new innovations, automation has potentiality for good and for evil—hence the mixed feelings among employees. The good it can bring about is increased personal remuneration, a shorter working week, more holidays and improved conditions of service in the matter of health and safety, with the elimination of the heavy and exhausting type of manual labour where automation can be introduced. But it can also bring about many upsets—redundancy, displacement of labour, deployment of labour, the need for further training and education, the taking on of heavier responsibilities, interference with present wage structures and avenues of production, and the like.

It is no good any Government or body of employers or trade union leaders expecting that such changes can be smoothly effected without a great deal of planning, preparation and consultation well beforehand, for it is the livelihood and the happiness of human beings which are at stake. There should, therefore, be continuous and honest consultation and co-operation at all stages between the employers and the unions. It is the plain duty of the parties primarily concerned with the introduction of automation to explain and interpret what the intended innovation is; how it is going to affect the workers; and how it is proposed to tackle the impact on the workers. It is really incredible with what amateurish clumsiness the problems of redundancy are tackled in certain sections of British industry, with all that that involves in the quite un-

necessary suffering and disillusionment and embitterment among the employees affected. There have been many excellent discussions held by authoritative bodies, and some good papers issued on the subject. It is the beholden duty of those charged with this difficult operation to acquaint themselves with the best and most successful current procedure in this field of personnel work.

Nor will industrial relations be any easier in this new climate of work than before. Indeed, they may well be more difficult. Replacement of labour will be more difficult, because of the superior type of operative required—more skilled, more responsible, with a higher standard of education and training. Management will, therefore, require more expertise in the handling of operatives, not only because of the difficulty of adequate replacement, but also because, unless management can secure the loyalty and co-operation of employees, the loss to production in inefficiency and indifference will be very costly indeed. Management will also need training as never before, and a different type of training. It will require a variety of technical competence—the technique of control, knowledge of, and training in, both mechanical and electrical engineering. And it may require to be more mobile both within an industry and without. This will certainly be so in the case of junior technicians and craftsmen. The manager in automation plants will find the field of management more complicated and more responsible, and it will probably be the case that, in larger undertakings, the problems of personnel will have to be left to a personnel manager trained, skilled and qualified in that most difficult of tasks.

Effect on Remuneration

There will be complications in the field of wage rates and earnings, as the T.U.C. Report points out. Where labour costs are relatively low, as is the case in efficient highly mechanised firms, it is often found possible to pay more than the average wage rates. But many unions in this country negotiate on a national basis and thus seek uniformity. How does the T.U.C. suggest that this problem be solved? Its proposal is one that would certainly not command universal assent: 'In the absence of suitable joint industrial or Government machinery for discussing or negotiating on consumer prices, it may be that, as consumers, trade unionists will have to be prepared to see the prices of some commodities and services rise (commodities and services produced in industries where there is little scope for automation) to accommodate their demands as producers and union members for uniform improvements in working and social conditions.'

Does that mean that the prices of commodities produced in industries where the application of automation is impracticable must be artificially raised beyond the proper economic level, in order that workers in those industries shall be paid the same wage rates as those working in industries where automation is admissible? This proposal would surely neutralise any benefits to the consumer consequent upon reduced prices due to automation; and the consuming public would be held to ransom in the cause of uniformity. Further, the recruiting position of those vital industries where automation had been introduced might be grievously weakened. For what incentive would there be held out to operatives to shoulder the extra responsibility and to undergo the extra training and acquire the extra skill?

Piece Work and Shift Work

Automatic machines will also restrict the opportunities for piece-work and bonus schemes, and this will not be to the liking of some employees. The T.U.C. Report suggests, however, that most workers prefer stable to fluctuating remuneration, and that the tendency might be to concentrate on job evaluation and merit rating schemes. But these are, of course, only surmises.

Shift-work will continue, for employers will want the fullest possible return on machines on which so much capital has been expended. It may be that many employees now on day-shift system will have to adapt themselves to a multi-shift system. This will affect the private lives of such employees, both domestically and socially. But with joint consultation fully used, such transitional difficulties can, and should, be effected fairly smoothly. There will be a continuing trade union responsibility in this, as well as other, directions; for they are vitally interested, as everybody else, in the preservation of peace and harmony in the industrial relations field, as well as in maintaining the competitive position of this country and securing its continuing prosperity.

Effect on Administration

Electronic computers can also revolutionise the normal administrative arrangements in offices and research departments. As the T.U.C. Report points out, they can provide up-to-date business facts and figures, otherwise difficult to obtain, which provide management with a much more satisfactory and reliable basis on which to determine policy than the incomplete information and guess-work hitherto available. It gives as an example the 'L.E.O.' handling the daily orders to the Lyons bakeries from more than 150 tea-shops. Every afternoon, we are told, it prepares all the data and records relating to production, assembling, packing, despatch, cost accounting and other processes; final revisions are received by telephone before 3.30 p.m.; and the job is completed by 4.45 p.m. It supplies management with four kinds of control information on which it can act. It gives the quantity of any item for which the total order is below a certain point; the percentage variation from last week's order of any item plus or minus 10%; comparison of lowest group of orders with the average of all groups; and lastly, total number of plus or minus daily revisions and value per shop.

The I.C.I. have recently ordered five machines. One will compute incentive bonus earnings and calculate a payroll of 7,000 employees. Another will compute sales statistics and the works costs of sales. Still another will calculate the procurement and control of raw materials and work out the costs of converting them to finished products. And the remaining machine is to be used for scientific work on a mass of routine data provided by chemical analysis equipment.* But small firms as well as large firms can benefit from the introduction of automatic machining, process-control, and electronic computers. As the T.U.C. Report points out, firms already have made hire service arrangements with manufacturers.

Automation, like nuclear energy, can therefore be of great benefit to mankind; it all depends on the wisdom and co-operation and purposes for which they are used. And that in turn will depend on the degree of consultation and co-operation between all the parties concerned. The very existence as well as the prosperity of mankind depend on the avoidance of unilateral action.

* *The Observer*, Sunday, August 26, 1956.

PHYSIOTHERAPY IN INDUSTRY

STRIKING results of experience in combating the vital problem of lost time in industry owing to sickness are given in a publication which has just been sent to several thousand employers in all branches of business and industry.

The booklet is entitled 'Physiotherapy in Industry,' just published by Aims of Industry Ltd., the industrial educational organisation. The results are of particular interest coming after startling figures given in the House of Commons by the Minister of Labour, Mr. Iain Macleod, recently, when he revealed that 280 mill. man days were lost through sickness last year and that at any given time 1 mill. workers can be expected to be absent from work. The loss of time through sickness was even 75 times greater than the time lost through industrial disputes.

Some employers, by providing facilities for physiotherapy, have found the answer to this grave problem, and the booklet shows how they have done it. One aircraft company estimates that it now saves 57,200 man hours a year through offering employees on-the-spot treatment for a variety of ailments and minor injuries. Another company employing only one part-time physiotherapist reports a saving of 20,000 man hours a year.

These are only two examples of what has been accomplished by progressive employers. Aims of Industry carried out the survey on which the figures are based.

Physiotherapy means treatment by physical means as distinct from drugs and surgery and is concerned with the alleviation of pain, rehabilitation after injury and the prevention of many conditions ever reaching the disabling stage.

Summer Meeting of the

Association Technique de l'Industrie du Gaz en France

ABSTRACTS OF SOME OF THE PAPERS PRESENTED FOR DISCUSSION

1. The Compression of Refinery Gases

MYVON LAURE, Research Engineer of the Direction of Research and New Techniques of Gaz de France, described the experimental methods and the apparatus used at the industrial testing station of Sète, an important centre of the chemical industry on the Mediterranean coast, for the study of the compression of gases and their partial condensation.

In his introduction, M. Laure says, 'The residual gases of the (petroleum) refining, as well as the gases manufactured from them (especially if they are enriched afterwards with refinery gas or with liquid petroleum gases) contain a greater or less quantity of hydrocarbons of the C_3 or C_4 series. The transmission of these gases over great distances, necessitating their compression, gives rise to problems relative to the condensation of these hydrocarbons, and in particular to the resulting loss of calorific value. These are the problems which we have tried to solve at the industrial testing station at Sète.' The paper describes in considerable detail the apparatus used in the experimental compression station and the methods which have been used in the course of the tests. The results obtained will form the subject of further publications.

The compressor, of the Luchard three stages type, has a nominal capacity of 15 cu.m. (530 cu.ft.) per hour against a maximum pressure of 150 kg. per sq. cm. (3,122 lb. per sq. in.); the tests were run at a maximum of 30 kg. per sq. cm. (427 lb. per sq. in.). Gas from the compressor passes through a distribution range and is then refrigerated to +5°C. Experience showed that, because of the very variable composition of the refinery gas, it was not possible to obtain coherent results without an homogenous sample. It was found to be necessary to install a 'balance holder' of 50 cu.m. (1,760 cu.ft.) capacity before the test plant. Gas of known quality could then be stored at 6 kg. per sq. cm. (85 lb. per sq. in.) effective pressure, equivalent to 250 cu. m. (4,830 cu.ft.) of gas, sufficient to carry out a series of tests.

2. Oil-Gas

Two papers deal with the cracking and reforming of refinery-residual gases for the production of town gas, and one with the use of heavy fuel oil in the Onia-Gegi plant at Cahors.

M. Jean Reboul, Chief of the industrial testing station at Sète, discussed the transformation into town gas of refinery residual gases and of equivalent hydrocarbons such as butane. He describes three types of plant; the generator P2 of Gaz de France, the GEIM and the Hasche, while in the second paper, he and M. Pierre Gross, engineer to Stein and Roubaix, describe the plant MS17 designed and constructed by this Company.

Gaz de France decided in 1954 to proceed to a systematic study of the possibilities of the employment of residual gases and set up this station at the gasworks of Sète la Peyrade (Montpellier) which is in direct connection with the Frontignan refinery of Mobil Oil Française.

As with most refinery gases those from Frontignan are not in themselves utilisable as town gas and must be completely reformed before distribution. This transformation, from the raw material to a gas suitable for distribution, may be approached in several ways: One can seek to produce a gas interchangeable with the usual town gas, but one can also contemplate changing more or less completely, in relation to the usual town gas, the proportion of the gas to be distributed after treatment. The latter entails the inconvenience of modifying the apparatus of utilisation, but presents the advantage of a wider choice among the processes of treatment in view of their qualities: Efficiency, flexibility, simplicity, cost, etc.

In another approach one can consider, whatever may be the gas finally distributed, proceeding to a treatment of the initial hydrocarbon in two stages to obtain, after a primary transformation, a stable gas capable of being transported to the points of utilisation to be consumed there, either as it is or after a secondary transformation. In this case the choice of the quality of gases to produce in the primary installation is relatively wide. On the other hand, questions of efficiency, simplicity, robustness, capacity, etc., acquire a great importance.

In either case, the autothermic processes have in particular the advantages of a high efficiency and a great capacity in operation and maintenance. It is apparatus of this type which is considered in the first of these papers, in their most simple form, that is to say without the use of what is known as a 'catalyser,' and therefore without an important part played by an injection of steam.

The autothermic process here considered consists essentially in passing continuously a mixture of air and rich gas into a generator where the reaction proceeds automatically at a temperature which, for a given apparatus and a given richness, is a function solely of the relative volumes of air and gas. The reaction exhibits several aspects of which the extremes are as follows: In the first, the air-gas reaction is produced in a granular contact-mass; it results in the nearly total destruction of the hydrocarbons of the rich gas and produces an end product which, at a low calorific value (1,400 to 1,800 cal. per cu. m., say, 147 to 190 B.Th.U. per cu.ft.), is a mixture of gases containing traces of methane. This total destruction takes place with a high air/gas ratio leading in a localised zone to temperatures of the order of 1,000°C., conditions in which no free carbon is formed. For example, in the case of commercial butane the air/gas ratio would be of the order of 10; carbon commences to appear if this ratio falls and it is definitely formed at the ratio 8. At the other extreme, the action of the air leads, by a relatively progressive reheating of the air/gas mixture, to a partial degradation of the hydrocarbons in an enclosed vessel without contact-mass, requiring a less volume of air and leading to lower temperatures, of the order of 650°C. to 850°C. Hydrocarbons resulting from this controlled oxydation can be produced in these conditions without the formation of free carbon. In the case of butane, for example, one can obtain with air/rich-gas ratios from 2.5 to 1.0 a gas with calorific value ranging from 6,000 to 14,000 cal. per cu. m. (630 to 1,470 B.Th.U. per cu.ft.) in stable operation. Tar and carbon begin to form at higher ratios, no doubt partly because of the higher resultant temperatures.

(Of the three types of plant investigated, the GEIM and the Hasche are fairly well-known in this country. We summarise the description of the P2 Gaz de France generator.)

Generator P2 Gaz de France

The generator which has been tested is that designed and constructed by the Direction of Research at la Villette, moved and re-erected at Sète. Plants of this type are in industrial service at a number of works with capacities up to 500 cu. m. (17,650 cu.ft.) per hour. The standard type shown diagrammatically in Fig. 1 consists principally of a steel cylinder, insulated and lined with refractory materials. It is entirely filled with a contact-mass consisting of grains of activated alumina, the grains of irregular shape and a diameter of some millimetres. At the upper end of the generator is an axial tube through which is admitted a mixture (which forms within the tube) of air and rich gas each of which pass through a circuit consisting of, after the reducing valve (for the gas), a stop valve, a regulating valve, a rotary meter (giving the rate of flow) and a volumetric counter. Air is fed through a com-

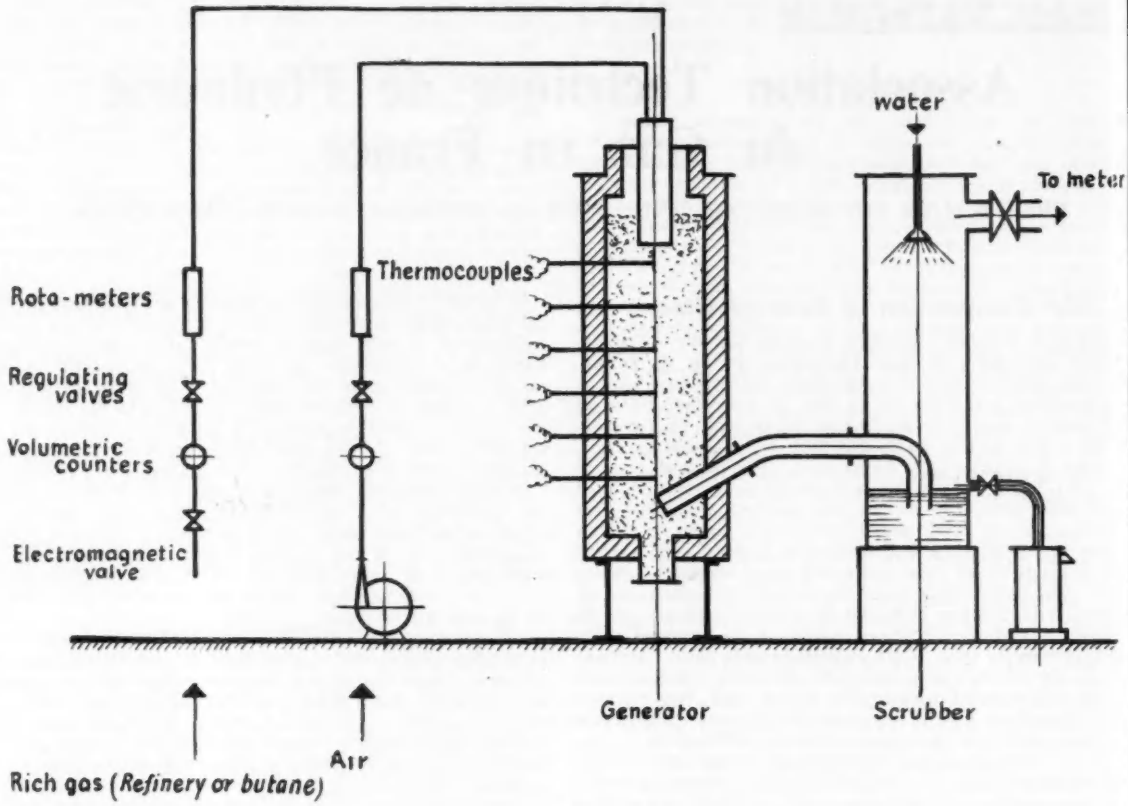


Fig. 1

pressor. Pyrometer tubes plunged into the contact-mass (generally three in practice, six for these tests) measure the temperature at different levels. Pressure gauges and thermometers at critical points in the circuits and security safeguards complete the equipment. The cracked gas passes to a scrubber and then to a gasholder after metering and enrichment.

After descriptions of the other two types of plant, the paper makes a brief comparison of the three. The theory of autothermic cracking is set out in a complicated formula. Twenty-four appendices give diagrams and results of the tests; very high thermal efficiencies were realised.

The Generator MS 17

Prior to these investigations, the company Stein & Roubaix had designed and constructed a generator for the cyclical thermal cracking of fuel oil for relatively small capacities. The design was based on the standard generator 'Simplex à soufflage inverse' (single back-blast generator, Gasmaco-Cleveland), improved and simplified, particularly with regard to the automatic control of the cycle.

One of these 'machines' has been erected at the Sète gasworks. After having been put into operation on fuel oil, it was then tried on the production, by purely thermal reaction, of a gas at a high calorific value from refinery gas or butane. The tests established the possibility of the satisfactory production of a gas with a calorific value of 10,000 cal. per cu. m. (1,050 B.Th.U. per cu.ft.).

A series of modifications was then embarked upon to secure a gas, produced from these raw materials, interchangeable with normal town gas. In particular the inert contact-mass was replaced by a nickel catalyser which had already given encouraging results in continuous operation (the Carboflex process). There arose considerable modifications in the construction and operation of the apparatus which eventually was entirely reconstructed; hence the cyclical catalytic reforming generator MS17.

The essential feature of the plant is the reactor in which the process is arranged on the planned cycle, in two main stages: Heating up, production. In the first stage, the gas to be reformed is injected in the presence of air and burns in the upper space of the generator, the products of combustion heating up the contact-mass containing the catalytic 'mass' surrounded by granular inert refractory material which acts as a thermal accumulator keeping the temperature of the catalyser as constant as possible. In this stage the products of combustion pass out to atmosphere. In the second (production) stage, the valve to atmosphere is closed, raw gas, air and steam are injected in suitable proportions to obtain the endothermic reforming reaction in contact with the catalyst, the resultant gas passing to the hydraulic main and the rest of the apparatus. Between the two main stages is the purge with steam, oxidising the free carbon formed on the catalyser.

The reactor is in form of a vertical cylinder of gas-tight steel, 'boiler' construction, carefully insulated by an interior lining of refractory materials. The air and gas is admitted tangentially through a burner consisting of the burner proper in metal terminating in a refractory block which constitutes a small combustion chamber; this remains at a high temperature sufficiently long to re-light the gas at the next period in the cycle. The bed of catalytic material is situated at about mid-height of the reactor. This material is in the form of Raschig rings supported on the silico-alumina refractory filling. This particular generator is not equipped with a waste-heat boiler but the tests show that it could be self-supporting in steam.

The cycle is controlled from a pyrometer inserted at a 'pilot point' in the contact-mass. Results are tabulated which show the great flexibility of this apparatus and its capacity of producing directly a gas interchangeable with town gas as well as gases of high calorific value. Thermal efficiencies up to 80% were realised.

3. ONIA-GEGI

In a further paper in this group, M. A. Laligrand, Engineer to the research department of Gaz de France, and M. J. Decaux, Engineer to the Gegi Company, report on tests in 1954-5

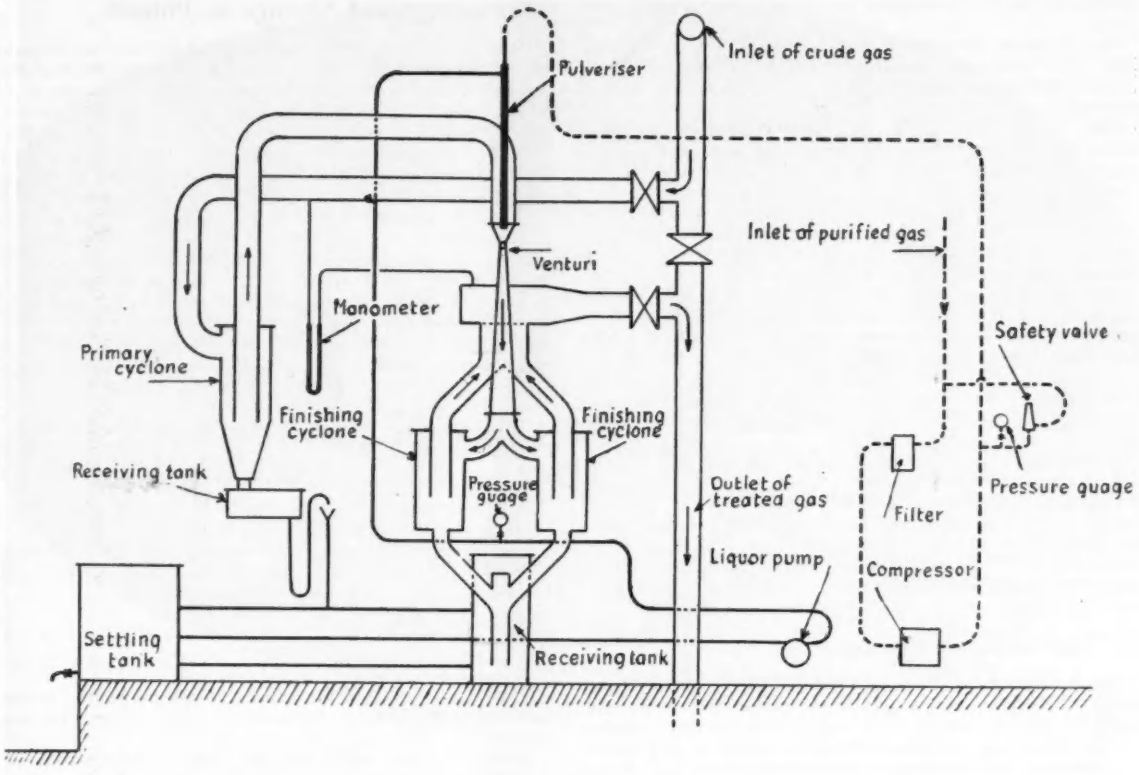


Fig- 2

of the Onia/Gegi plants at Cahors to investigate the possibilities of gasifying in this plant non-selected fuel oils, of high viscosity (Conradson) and containing refinery residues. They found that oils of this character from Frontignan could be gasified with acceptable efficiency provided that the oil was not injected directly on to the catalyser. They established empirical relations between the thermal efficiency achieved and the characteristics of the oils available.

Complementary tests will be carried out in the current summer on one of the oldest units at Cahors which will be used in the future for the atomisation of oil for conversion in a pre-steaming chamber. These tests will be directed principally to a systematic study of the impurity content of the gas and problems of tar recovery.

4. New Processes for the Detarring of Gas

Messrs. Audry and Bellemin of the gasworks, Châlon-sur-Saône, report on the use, there, of the Aero-Venturi detarrer and of a new process by M. Audry himself using the condensation of steam.

The standard combination of scrubber and pelouze was found insufficiently effective in throwing down the fine particles of tar produced in the cracking of petroleum products, gas oil or paraffin distillates, in the carburetted water gas plant.

The principle of the Aero-Venturi process is to remove a portion of the tar in a primary cyclone, then to increase the size of the particles remaining in suspension by agglutinating them by shock with those of a fine mist of water or liquor in the neck of a venturi tube, and finally to throw down the enlarged particles in a finishing cyclone. The 'fine mist of water or tar' is provided in a 'pulveriser' placed at the entrance of the venturi. It consists of two concentric tubes leading to a fine nozzle. Gas already purified enters the central tube under pressure; the outer tube leads the water or liquor, also under pressure, to the nozzle. The gas to be detarred enters the venturi in the neck of which it is mixed at a high velocity (about 100 m. (say, 350 ft.) per second). The violent impact of the two streams leads to an agglomeration of the vesicles of tar in suspension. From the venturi the gas passes to two 'finishing' cyclones arranged in parallel in which the

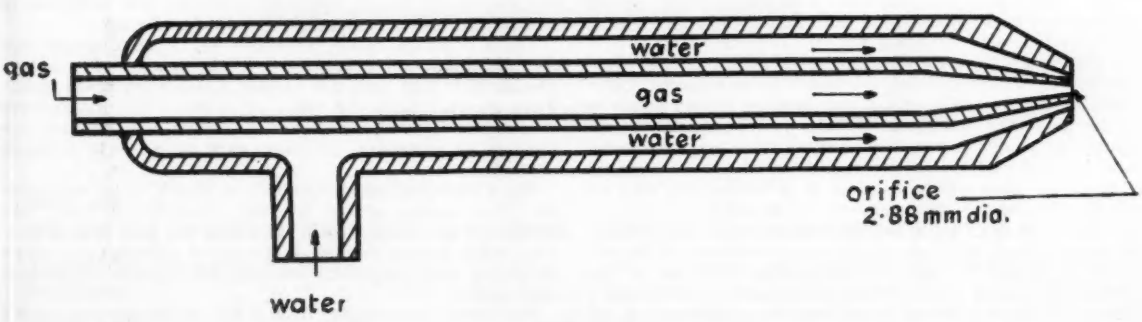


Fig. 3

vesicles of tar, thus enlarged, are thrown down and drained away.

Fig. 2 shows the general arrangement of the apparatus; Fig. 3, the 'pulveriser' or atomiser. (Note: The inner tube is axially movable so that the degree of atomisation can be adjusted.)

The 'water' fed to the 'pulveriser' is preferably liquor taken from the upper part of the settling tanks. It was fed in, during the tests, at a pressure of about 1½ atmospheres; the purified gas is entrained by the liquor at this pressure.

The content of the crude gas in tar plus dust averaged 28 mg. per cu. m. (say, 1.22 grains per 100 cu.ft.). Efficiency at this figure was 90%, but it rapidly fell to 50% if the tar plus dust was three times as great.

The Aero-Venturi apparatus was thus found to be somewhat inflexible. It had the further disadvantage of throwing a significant back-pressure (about 590 mm. of water). The apparatus devised by M. Audry on the other hand had the advantage of being very simple, it effected practically complete detarring, was very flexible, it threw a negligible back-pressure and could be mounted without special arrangement in the normal works circuit.

In the Audry apparatus the crude gas is mixed with humidified steam and condensed in an ordinary condenser in which the particles of tar are entrained with the water of the condensation. The steam is injected into the stream of gas entering the vertical water-tube condenser by way of a pulveriser similar to that of the A.V. apparatus except that water is in the inner tube (which is fitted with a steel helix towards the nozzle) and steam (saturated at 3 or 4 atmos.) in the outer.

5. Thickness of Plating

M. Georges Pirou, Engineer of the Direction of Research and New Techniques, presents in this paper a review of the several techniques which can be applied to the determination of the thickness of steel plates from the outside of such vessels as gasholders and steel mains; photography, television, acoustic and ultrasonic methods, radiography, electrical and magnetic methods. He describes more particularly the magnetic method perfected by himself and M. Renaudie; it was described in the J. des U. à G. in January, 1955 (see our abstract in the feature 'Gas in France,' 'GAS JOURNAL,' March 30, 1955, p. 848). This method has now been successfully applied to some 64 gasholders and to a number of other cases. The apparatus is extremely robust and of low cost. It requires only access to the outside of the plate to be examined, it involves no destruction of metal, it requires neither delicate preparation nor specialised manipulation.

6. Bacterial Pollution of Gasholder Water

This paper is a detailed study not only of the bacteria themselves, *Desulfovibrio desulfuricans*, but of their activities in some 24 actual gasholder tanks. It is a collaboration between M. J. C. Senez, of the National Centre of Scientific Research, M. F. Pichinoty of the Corrosion Laboratory of the Centre of Scientific and Industrial Research of Marseilles, and M. G. Geoffray of the Direction of Research and New Techniques of Gaz de France. Their work may be taken to establish the fact that the pollution by hydrogen sulphide of gasholder waters and of the gas thus stored is indeed due in most cases to the activities of these bacteria. Details of their observations are given in the paper.

Their conclusions are: (1) That it is established by direct evidence that three phenomena are simultaneous and related, (a) the progressive disappearance of sulphates contained in make-up water, (b) the appearance of sulphides, and (c) proliferation of sulphate-reducing bacteria; (2) the bacterial reduction of sulphates was observed to a greater or less degree in all the gasholders examined; (3) laboratory experiments with a pure culture of these bacteria isolated from gasholder water have demonstrated the precise conditions of the development of these organisms and have shown in particular that they are capable of using for their metabolism the molecular hydrogen of town gas—and finally that this pollution can be attacked by such different processes as, (a) the stabilisation of the sulphides by acetate of zinc, (b) the specific inhibition of the bacteria by metallic chromates and bichromates, (c) preliminary desulphatation of make-up water, and (d) withdrawal of the sedimental mud from the bottom of the holder tanks.

7. Underground Storage in Poland

Messrs. J. Kaczorowski and W. Kolodziej show in this paper that the underground storage of gas has been employed in Poland to meet peak loads of consumption. An almost exhausted deposit of natural gas situated in a region of variable gas demand has been used for this purpose. The authors describe the geological and stratigraphical conditions of the site, the characteristics of the storage, the nature of the natural gas approaching exhaustion and that of the gas injected. They describe the equipment involved. They discuss the question of the gas-tightness of the storage. So far the pressure of storage has been in the region of 20 atmospheres. Higher pressures are contemplated. Results are considered to be so satisfactory that 'The storage of natural gas (described in the paper) is only the beginning of bigger things in this domain, with a view to preparing underground storage of excess gas to cover peak loads in the consumption of coke oven gas.'

(To be concluded)

GAS IN FRANCE—UNITS OF HEAT

THE following is translated from the *Journal des Usines à Gas*, June, 1956, p. 246:—

'We call attention to the following units which are relatively little known: the megacalorie, Mcal; the gigacalorie, Gcal; the téracalorie, Tcal. To complete the table we add:

(1,000 cal = 10^3 cal = 1 Kcal).
1,000,000 cal = 10^6 cal = 1 Mcal.
1,000,000,000 cal = 10^9 cal = 1 Gcal.
1,000,000,000,000 cal = 10^{12} cal = 1 Tcal.

These new units are conveniently employed in the evaluation of calorific energy contained in large volumes of combustible gas, thus:

1,000,000 cu.m. at 4,000 Kcal per cu.m. is equivalent to:
4,000,000,000 Kcal.
4,000,000,000,000 cal.
4×10^{12} cal.
4 Tcal.

It may be here remarked that, in translation, the English *therm* is often confused with the French unit, the *thermie*. It should be remembered that:

One (English) therm = 25.2 (French) thermies.
One (French) thermie = 0.039683 (English) therms.
(0.04 would appear sufficiently accurate for most purposes. Trans.).

'La thermie,' although a unit legal in France, is not an international unit.

(Readers will note that 'giga' is derived from the Greek 'gigas' from which is derived the word 'gigantic' and 'téra' from 'teras,' a monster. For a more detailed account of the definition of 'la thermie' and its application in practice, see the 'GAS JOURNAL,' September 8, 1954, p. 575.)

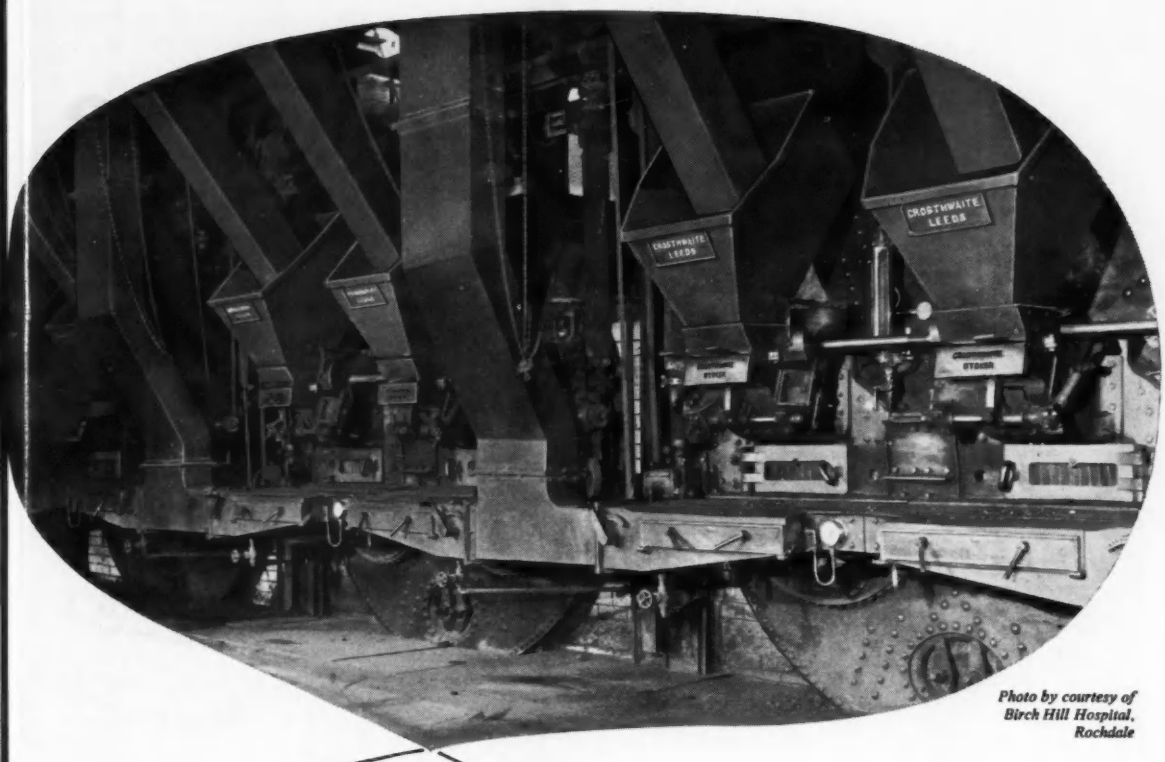
REPORT ON VIBRATED CONCRETE

THE report on 'The Vibration of Concrete' prepared by the Joint Committee of the Institution of Civil Engineers and the Institution of Structural Engineers, was published on September 1 in the form of a fully illustrated booket.

The Committee makes 11 points for a draft specification for vibrated concrete additional to the clauses of a normal specification, and calls for further research on seven points. These points include the best type of mixer for dry concretes as used for vibrated work, and for research as to the best proportions of immersion vibrators, such as the ratio of length to diameter, etc.

The Committee, which first met in March, 1951, was under the Chairmanship of the late Dr. Oscar Faber, C.B.E., who completed the report before he died, and had been set up. 'To review present practice in the use of vibration as a means of placing and compacting concrete, with special reference to mix design.'

The report is obtainable from either of the two Institutions, price 3s. 6d. to members, and 8s. to non-members.



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THE EUROPEAN GAS ECONOMY

Abstracted from a Document Prepared by the Secretariat of the Economic Commission for Europe

(Concluded from last week)

GAS transport grids have been much developed during the last few years, especially in countries where a major part is played by coke oven plants or natural gas, and the creation of such a system may be due to a number of considerations. It may depend on considerations of general economic policy, the necessity for industrialising an area for instance, which have little to do with the economics of transport as such, or on systematic efforts to develop the use of gas, as would appear to be the case in some eastern European countries. In Czechoslovakia, for instance, where the increase has been about tenfold since 1937, the length of the feeders is 20 times greater. The reasons given for this remarkable development are the relative efficiency with which gas is transported in comparison with other forms of energy, and the need to absorb the available volumes of coke oven gas.

For the gas industry itself the advantages of an adequate transport system are that it can make gas available to new markets and to widely differing types of consumers. A common transport network for a number of producers will help to smooth out surges in demand without increasing, and even by diminishing, the cost of gas delivered. This may be partly owing to an improved utilisation factor for producing units.

Cost of Transporting Gas

The cost of transporting gas which depends on many factors, such as maintenance charges, which vary with the length of the feeder and inversely with the flow, blowing costs and the fixed charges on the feeder and compressor stations, must be compared with that of transporting coal from the supply centre. Within a certain radius, the extent of which depends on the quality of the gas, it is more economical to transport the gas and it is therefore better to build the gasworks near the source of raw materials. Outside this radius the works will have to be built near the centre of consumption. In the locating of coke oven plants the extent to which the markets for coke and gas coincide geographically must also be considered. If practically all the gas produced can be taken up in the same area as the coke no problem arises, but if it cannot, it is necessary to find a compromise site, which will depend on the comparative costs of transporting the gas or transporting the coal and coke. If a gas grid is to pay, the cost of gas production plus transport and distribution charges must be less than the unit costs of gas produced in a local gasworks and distributed direct to the consumer. Where the price of the gas transported is low and compares favourably with the prices of competing fuels, the feeder may be relatively short, as local demand will be created, but under less favourable conditions it may be necessary to transport the gas further to find adequate markets for it.

If, however, the feeder passes through or close to built-up areas or the plants of industrial consumers the cost per cu. m. of gas transported will be correspondingly lower, and the high demand will encourage rapid amortisation.

Gas transport over long distances has been steadily developing in Europe. In France the gas-transport grid more than doubled between 1947 and 1953, while the distribution system expanded by only 2%. The gas-transport network in Western Germany has existed for many years, more than half the coke oven gas produced there passes through its feeders. In Belgium, too, since 1932, coke oven plants have been working to an increasing extent for the transport grid and this growth in the transport of gas has grown side by side with the increase in production. The proportion of all gas distributed passing through the transport system amounted to 3% in 1931, 51% in 1932, 73% in 1947, and, finally, 82% in 1953. In the United Kingdom, on the other hand, there was very little transport of gas before the war, except in the Cardiff and Sheffield areas, but at the present time gas transport shows signs of expanding fairly quickly. Where transport does take place it is usually a weblike system round the large centres of population and a network of low- and medium-pressure mains. Similarly in Czechoslovakia the development of the transport system is comparatively recent, 48 km. in 1952, 300 in 1946 and nearly 1,100 in 1953. At present more than 54% of the gas produced for public distribution goes through long-distance feeders and the volume transported has more than trebled since January, 1946. It is planned to increase the length of long-distance feeders up to 3,100 km. by 1960. In Eastern Germany, the transport system has increased in length by 20% since 1953 and is planned to increase by 160% by 1960. The creation of such long-distance transport networks is necessary to any considerable expansion of the gas industry which could hardly take place without it. Gas grids ensure a certain balance between supply and demand over a given area by dividing up among different producers the burden of keeping consumers supplied. They are equally valuable in storing the gas and by variations in pressure they can help to iron out daily peaks.

Underground storage has been used to cover not only daily peaks but also technological, or seasonal peaks, which call for far more extensive storage facilities. This originated in the United States and Canada, where formations previously holding deposits of natural gas were used. Recently, however, an underground reservoir has been built in a water-bearing limestone formation. For Europe underground storage would obviously provide the best means of solving the gas industry's problems, particularly in the field of domestic heating with its seasonal variations. The possibility is receiving special attention in Western Germany, where 'Ruhrgas' are using an underground storage plant on the Engelbostel anticline, and in France, where it is proposed to build a vast underground holder at Beynes, near Grignon, in the Paris area. In the United Kingdom experiments are being made with disused salt mines near Durham. In eastern Europe, too, newly built coke oven plants are making large volumes of gas available throughout the year, and the need for large underground storage facilities is becoming necessary. The chief advantage to be gained from underground storage is that it will make possible to operate transport mains with a high utilisation factor, and obtain all the advantages from constant flow.

Rigidity of Gas Industr

The cause of the present rigidity of the gas industry is insufficient flexibility of supply, particularly in countries mainly tied to coke oven plants. Often it is a brake on the large-scale development of the gas industry because it complicates the necessary search for new outlets where variations in consumption may be considerable, which are bound to persist to some extent, as the very flexibility in the use of gas is one of

recognised advantages. Production units should, therefore, be easy to start up or shut down, and production easily adjusted in accordance with daily or seasonal variations or with fluctuations of a technical nature.

Where, however, coke oven plants are designed to produce metallurgical coke, the influence of the demand for gas on their production is very small. Capital is invested in them because coke is needed, and not because of gas demands. Gas available from coke oven plants now and in the future should therefore be looked on as something which must be put to the best possible use and the regularity of supply should as far as possible be assured by appropriate legal means, in particular by contracts with minimum supply clauses.

Gas-producing coke oven plants are quite different, as they are built to supply foreseeable requirements of gas, but they cannot be operated without taking the coke market into account. As it is becoming increasingly difficult to make such installations pay their way, it is at the moment extremely doubtful whether they could produce gas at prices which would allow a large expansion of the market. Clearly natural gas has advantages of flexibility that need hardly be mentioned; and those countries fortunate enough to possess it should develop it to the full.

Loosening the Bonds

It is possible, however, that the new processes which are beginning to reach a stage of industrial application will help the gas industry to loosen a little the bonds which at present tie it to the coke market.

For a country like Czechoslovakia, where the gas industry has only recently been developed to any large extent, coke oven gas represents at present 37% of the gas distributed but in 1960 this proportion is planned to be 15% only, as natural gas and gas from total gasification plants will largely be called upon to hold a proper balance between supply and demand.

The theory that the demand for gas will vary in direct proportion to its price is not altogether sound. Reducing the matter substantially to its simplest terms, it might be said that there is a critical point when the price of gas is equal to the price per useful calorie of competitive sources of energy; fuel-oil for example. Below that point demand rises and above that point it decreases. This, however, is oversimplified; the curve is not, strictly speaking, discontinuous; which means that there is in fact no critical point but a critical zone, the curve merely falling more quickly once the prices of competitive fuels are exceeded. This is due to the effect of a number of indirect factors, *e.g.*, the savings in equipment and labour resulting from the use of gas, but once the decision has been taken to use gas or to substitute another type of fuel for it, there is a time lag, often large, between the decision to make the necessary capital outlay and the actual effects of the change. Although it is true that tariffs will in the long run influence the future demand for gas, gas prices do not necessarily act in the same way as in the traditional type of market economy, where prices rise as supply falls short of demand and vice versa and a kind of automatic balance is maintained between the two. The position of gas is quite different, at any rate so far as public supply is concerned, so that gas prices do not react very rapidly to the normal influences of supply and demand.

One Essential Idea

Whether gas supplies are in the hands of the community, as in France or the United Kingdom, municipally owned as in West Germany, or are the subject of concessions, as in Belgium and in some instances in Western Germany, there is always one essential idea at work, that of the public utility, and public authorities limit price variations by means of indexing formulae which link prices to costs. This robs prices of all immediate flexibility and makes them behave quite differently from the free prices in a competitive economy. This is by no means wholly disadvantageous, particularly for the consumer, but it does prevent the use of gas prices as an instantaneous means of restoring the balance between supply and demand.

In countries with a planned economy the whole mechanism of prices is, of course, different, but even so, prices may be used systematically to encourage or discourage the use of some fuels. For example in the Soviet Union the principle used is that, in order to promote the development of gas consumption, the prices of solid fuels may in no case be fixed at a level lower than the prices of gas. In Czechoslovakia also price mechanisms have been largely used to stimulate demand.

Customers 'Tied Down'

The impact of price changes will vary according to the type of consumers. As a rule, gas demands for domestic consumption are not very elastic, though no definite proof of this has yet been forthcoming. A study of the specific consumptions of gas in distribution systems with different prices shows variations which are far from insignificant, but it is certain that domestic customers react slowly to variations in prices, mainly because they are tied down by their appliances.

This, then, shows the importance of the conditions of sale and installation of appliances; all the more so because the development of any form of energy is, for physical reasons, largely tied up with the installation of new appliances.

Industrial demand combines a consumption of gas for both chemical and thermal uses. As a chemical raw material coal gas and natural gas are competing directly with petroleum, so the demand is extremely elastic, but when used as a fuel the choice of gas is influenced by what proportion of the total costs of production fuel represents. Relatively heavy industries use a great deal of heat, *e.g.*, cement-works or briquetting plants, and brick-works, *etc.*, where thermal energy accounts for as much as 15% of the cost, while in other industries fuel may account for only an insignificant proportion of production costs. These are, in general, the processing industries, such as engineering, textiles and others, where thermal energy accounts for a mere 1% or less, of the cost. In these industries elasticity of demand is as a rule not very great. but certain cost considerations, although indirect, nevertheless have a very strong influence on demand. It frequently happens, for example, that the use of gas makes it possible to reduce capital expenditure considerably.

'A Serious Thing'

The development of the gas industry on coal or other raw materials, if gas production increases on a large scale, is of paramount importance for the coal industry, whether gas becomes a strong competitor or a customer of the first magnitude, and a fundamental question to be answered is whether coal can remain the chief source of raw material for the production of gas.

Coal production lacks flexibility and can with difficulty adapt itself to large fluctuations in demand, so it follows that it is important that, while industrial coal consumption is influenced by varying levels of economic activity, the domestic consumption is not much affected. The domestic market is thereby particularly well suited to the coal industry, and it is therefore a serious thing for this industry that competition from oil is becoming so severe. The development of coal-gas consumption at attractive prices for heating might be a means of indirectly maintaining coal's share in the domestic sector.

Coal as such is in a more difficult position than other forms of energy, because its use is not distinguished by the convenience and versatility which are more and more essential at the present time. The conversion of coal into electricity is one solution; but electricity—although perfectly suitable for uses where motive power is needed—is not so suitable for other purposes, so there remains the conversion of coal into gas. This is, on the face of it, an attractive proposition, as it may indirectly open new markets in fields to which coal, in its raw form, is not suited. The traditional gasmaking processes, too, make it possible to recover the by-products, which are often indispensable raw materials in themselves.

Except in unusual circumstances (a prolonged depression in the steel industry, for example), there is seldom any difficulty in finding a market for coking coals, and this is in the main true of anthracite. but there are serious difficulties with many other coals, especially ordinary industrial coals and the lower grades, so an appreciable increase in the tonnage used for making gas would be particularly welcome if the range of gasifiable coals could be extended. Although the traditional methods of producing gas from coal can be adapted to a wide range of gasifiable coals, it is only possible within rather narrow limts and the extra coke produced would have to be disposed of. To overcome this, there has been renewed interest

in the search for an improvement in, or new methods of, total gasification.

In Czechoslovakia, Eastern Germany and Hungary, where lignite is the basic primary fuel, gasification appears to be a particularly worthwhile method of efficiently using this national resource.

The oil industry too has shown some interest in becoming a major supplier of the gas industry, as it might find an indirect market where the use of gas is preferable to that of liquid fuels. The oil industry, too, is interested in the extension of the use of refinery gases which is now developing fairly rapidly.

The effect of such estimates of future gas consumption as are at present available on raw material requirements can only be assessed very roughly.

Diminishing Coal Needs

Under present conditions, coke oven gas production will increase, natural gas supplies develop considerably and the use of petroleum products for gasification will spread, so that coal requirements of gasworks in general will tend to diminish.

So although the future erection of coke oven plants for gas production alone is unlikely, they will continue to be built for reasons connected with other industries, such as iron and steel and chemicals, and the expansion may be estimated by the probable development of the iron and steel industry. Pig-iron production in Europe as a whole, in 1960, is estimated at 87 mill. tons, compared with 65.5 mill. tons in 1955, or an increase of 33%. And even if the present consumption of coke in blast furnaces of about 950 kg/t may be somewhat reduced, by better preparation of the burden, the probable increase in coke oven gas is likely to follow the rise in coke production.

The prospects of Italian natural gas production seem to be extremely favourable and some experts think that in 1965 it might reach 10 bill. cu. m., against 3 bill. in 1954. In France, too, where natural gas production was only 0.251 bill. cu.m., the estimated increase to 3 bill. cu. m., is now generally thought to be too modest.

The output of natural gas is rising in Austria, and it may also be imported from Italy. In the Netherlands the available quantities are likely to expand, but in Western Germany, where prospecting for natural gas is going on, what gas is available will probably continue, as at present, to be mainly absorbed by the chemical industry.

In the United Kingdom prospecting has so far been fruitless but in Spain the outlook seems promising. In the Soviet Union, the bulk of increased production is to come from natural gas; as is also planned in Czechoslovakia.

The use of refinery gases and liquefied petroleum gases, the gasification of oil and the production of carburetted water gas are steadily being developed. In France and Spain the various oil products used for gas production are increasing regularly, while in the United Kingdom the forecasts of raw material requirements show that in 1959/1960 the Gas Boards will use about 32% more of these products than in 1952/1953, chiefly for the production of carburetted water gas, equivalent to about 866,000 tons of coal against 655,000 in 1952/1953, although it will still represent only 3% of total raw materials in calorific value. The consumption of oil may, however, increase as the gasification of oil develops, but in Western Germany, with her large indigenous resources of coal suitable for carbonisation, it does not seem likely that it will become important.

In the Netherlands the use of refinery gases is likely to increase. At the Pernis refineries, near Rotterdam, about 48 mill cu. m. of town gas are at present being supplied and it is estimated that this volume may soon reach 200 mill. cu. m.

Future Prospects

Coke oven gas and natural gas will be the basis of the future pattern of gas and the use of petroleum products will develop. Natural gas will play an essential part in Rumania, in Italy, in Czechoslovakia and, to a certain extent, in the U.S.S.R., and it will become of greater importance in France, where some experts think that within the next 15 years two-thirds of the South-West will take practically all its gas in the form of either natural gas or gas produced from oil refinery products, whereas the rest of the country will be supplied mainly with coal gas. In the Netherlands, there are plans to combine coke oven gas from the State Mines and Sluiski with blast furnace gas, natural gas from the North and petroleum gas from the Pernis refineries. In Western Germany coke ovens with more gas from gasworks of the traditional type and total gasification plants will continue to meet the greater part of requirements; neither is the structure of the Belgian gas industry likely to change very much. In Poland coke oven gas production will be supplemented by that of total gasification plants.

Although it seems that coal gas will have to make way for natural gas and gasified petroleum products, it is unlikely that the coal industry will in no way benefit from the expansion of gas consumption.

In their very cautious estimates, the Gas Council in the United Kingdom, for example, state: 'Although the total amount of gas available (distributed through the Gas Boards only) is expected to increase between 1953 and 1960 by 15%, only 1.6 mill. tons or 6% of the 1952/1953 consumption of 27.6 mill. tons will be added to the industry's coal needs.'

In France, Gaz de France forecasts that slightly less coal will be distilled by its gasworks and coke-oven plants in 1961 than at present. but additional quantities absorbed by coke ovens at collieries and iron and steel works will largely offset this reduction, without however considerably increasing coal requirements.

The coal requirements, then, for gas and coke-making for western Europe generally may be roughly estimated at about 20% above the 1953 throughput, corresponding to about 180 mill. tons against 153 mill. This estimate may prove too high in the event of new discoveries of natural gas, and may create problems of quality. New processes may be needed to gasify coals of lower rank.

For Europe as a whole, then, even taking into account the doubling of production of coke oven gas forecast for the U.S.S.R. and likely developments in Czechoslovakia and Poland, coal gas production would seem to be becoming a smaller proportion of the total, especially in coal importing countries, although in point of fact there will be an increase in the quantities used for gas and coke making.

So if the gas industry were, as seems desirable, to develop on a much larger scale, the raw material problem would be quite different. Supplies from coke ovens increase in relation to the development of industries other than the gas industry. Supplies of natural gas would not change either, as full advantage must be taken of this wherever possible.

Total Gasification

The problem of raw materials will, therefore, be limited to the supply of gas in quantities over and above those provided by coke ovens and natural gas. In countries where there is little competition from petroleum products, intensive efforts will probably be made to increase gas production from total gasification plants, though these units, either alone or working with other production units, such as carburetted or non-carburetted water gas, have not yet been proved economically sound. If they are developed on thoroughly economic lines, however, they should radically improve the situation for coal, especially if they can use low grade fuel.

The distillation of oil has all the advantages of integral gasification so that although the emphasis on cost, or on the efficient use of energy resources, may be different in planned economies and in countries with a different economic structure, the choice between these processes must in the end be resolved partly by the cost of the processes, including investments, and partly by the cost of raw materials.

The cost of coal extraction appears to be rising in most countries and it is possible that in the long run coal may run a risk of being priced out of the gas market proper, unless the industry is prepared to make special efforts to maintain its place there, by encouraging the extensive gasification of low grade fuels.

How is the gas industry going to maintain an adequate equilibrium between oil and coal? This involves making assumptions as to availabilities and costs, and these may alter fairly rapidly. It is almost impossible to forecast, but in a paper by G. Robert, to the West German gas industry entitled 'Economic Relations between the Gas and Oil Industries,' he stresses the need for the gas industry to adapt its structure to expansion but first it must have a low cost basis in an expanding economy to absorb temporary set backs.

Abstract of a Paper Presented at the Fifth World Power Conference

Recent Research and Developments in the Thermal Treatment of Coal

By W. IDRIS JONES,
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DIRECTOR-GENERAL OF RESEARCH, NATIONAL COAL BOARD.

CONTEMPORARY developments in the thermal treatment of coal in Great Britain are concerned with the use of those coals which are not normally regarded as carbonisation coals, as raw materials for the manufacture of smokeless domestic fuels and gas. Research in this subject has recently acquired a new urgency from the knowledge that the Government are shortly to enact legislation regulating the emission of smoke from domestic fires in the more densely populated areas, on the general lines of the recommendations of the Committee on Air Pollution, published at the end of 1954.

The Committee's most important recommendation was that the 19 mill. tons of bituminous domestic coal at present consumed in so-called 'black' areas should be replaced, over a period of ten to 15 years, by smokeless solid fuels, electricity or gas, and that the larger part of the burden of replacement should fall on manufactured solid smokeless fuels.

While the smokeless fuels problem is the major preoccupation of technical research on coal at the present time, a considerable effort is also being devoted to obtaining a better understanding of the classical coking process, with a view particularly to improving the quality of industrial cokes made from inferior coking coals and from blends.

Raw Materials for Thermal Treatment Processes

There is in Britain a particular shortage of the coking coals of prime quality needed for the manufacture of metallurgical coke, and, as the years go on, an ever-increasing proportion of our total output will consist of non-caking or weakly caking, high volatile coals. To try to satisfy the expected substantial increase in demand for smokeless fuels merely by expanding the existing carbonisation industries would not be practicable as the carbonisation industries themselves will have to use increasing tonnages of coals outside the range of coals hitherto carbonised. As mechanisation of the pits has proceeded, the proportion of small coal in the total output has increased, so that today there is an acute shortage of large coal, though the demand for small coal for electricity generation is rising rapidly and the coal that will be displaced from the domestic market by the substitution of smokeless fuel will be mainly large coal. The demand for large coal by the railways as the plans of the British Transport Commission for electrification and dieselisation are developed will also fall. It is not easy, therefore, to forecast the availability and demand for large and small coals, but it seems most probable that the raw material which will be used to made the smokeless fuels needed to meet the new demand will come mainly from large coals displaced from the domestic and locomotive coal markets.

The greater use of closed appliances will help the national fuel economy, but there is at present an unsatisfied demand for suitable fuel, particularly that of premium quality, to supplement the strictly limited supplies of natural fuel. In the years ahead, however, the larger increase in demand will undoubtedly be for smokeless fuel for open grates. From the research standpoint, the provision of smokeless fuel of these two types presents distinct and separate problems, because of the differences in fuel specifications (chiefly of reactivity and permissible ash content) for the two applications, which are more stringent for open-grate than for closed appliance fuel, and because of economic considerations.

Phurnacite, a high quality carbonised ovoid manufactured and marketed by the Board, is now a well-established fuel for closed appliances. The present production is 350,000 tons per annum, which is to be expanded to 634,000 tons per annum in 1956, but the market would probably absorb nearly as much again. Further extension, however, of the process in its simplest form, as now operated, will be impossible on account of the lack of suitable coal of the 201 (dry steam volatile 10-13.5%) type. The National Coal Board research organisation has therefore been studying possible ways of extending the range of coals to which the process may be applied. The caking steam coals were first studied. These cannot be used directly for the manufacture of carbonised briquettes because of their excessive agglutinating and swelling power, but it has been shown that the agglutination and swelling can be reduced to the desired extent by a mild pre-oxidation of the finely divided coal by air at a temperature of 300°C. Pre-oxidation can be carried out most efficiently and economically by the fluid bed technique, which lends itself to continuous operation, and the process has been operated successfully on the semi-technical scale, treating one ton of coal per hour.

The pre-oxidised coal is delivered from the fluidiser at a temperature of 300-350°C. and as this product, after being formed into briquettes, has to be carbonised, the possibilities of hot briquetting to conserve heat have been examined. Using normal amounts of binder, it is possible to briquette the coal particles under a pressure of two tons per sq. in. at temperatures between 300 and 350°C., provided the residual agglutinating power of the coal is adequately controlled. This process too has been operated on the small plant scale.

Experience shows that this process could be operated economically on the large scale, but it is applicable only to a narrow range of coals which, moreover, are themselves 'smokeless.' A much more important problem, therefore, is that presented by the low-rank coals, which cannot be pretreated by oxidation, because the briquettes made from the oxidised coal require an excessive proportion of binder to ensure that on carbonisation they yield products of requisite strength and freedom from distortion. Research has therefore been directed towards fluidised devolatilisation as a method of pre-treatment for low-rank coals, before the briquetting and final carbonisation stages, a pre-treatment which also completely destroys the agglutinating properties. It has been shown, however, on the experimental scale that the use of a prohibitively large proportion of binder in the briquetting stage can be avoided by using, instead of pitch, a mixture of pitch with a fusible coal, and carrying out the briquetting at an elevated temperature.

Continuous Operation

For the final stage of briquette carbonisation, the Board have sought to evolve a method which preserves as far as possible the ideal of continuous operation as distinct from the batch operations of conventional carbonisation processes. To make this possible, the rate of transfer of heat to the briquettes must be increased and it has been shown that it is possible by carrying out the carbonisation in a fluid or mobile bed of hot sand to reduce the processing time of the briquettes to about 30-45 minutes from the 4½ hours in the indirectly heated retorts of the Phurnacite plant. This sand carbonisation process has already been operated continuously for long periods on a scale of 50 lb. per hr., and a larger plant is now in course of erection. The possible extension of this process to the thermal treatment of coal generally, outside the comparatively narrow field of briquette carbonisation, is being considered.

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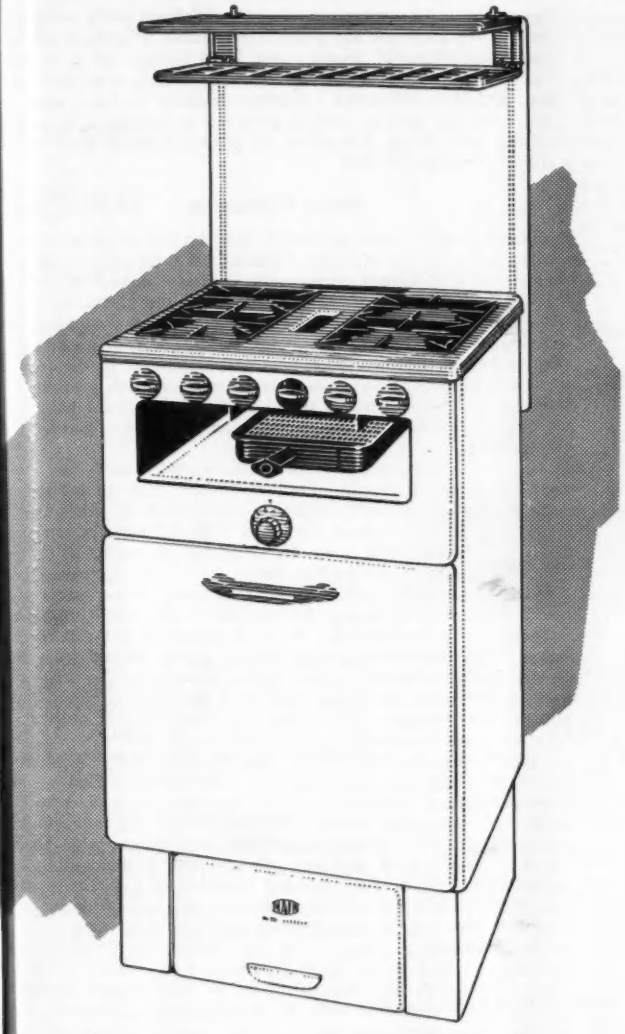

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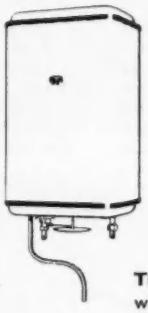

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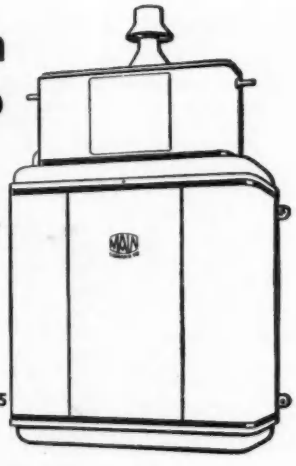

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lined has still to be established, but the high yield of by-products obtained in the pre-carbonisation stage (if these can be disposed of at the utmost profit) is very much in its favour.

It is inevitable that a long time must elapse before such novel processes can operate commercially, so the Board have investigated the possibilities of more direct methods for treating carbonised briquettes from low-rank coals, in well-tried plant. Laboratory work has shown that the unsatisfactory results from the direct carbonisation of pitch-bound briquettes made from low-rank coals is connected with the high rate of evolution of the volatile matter. With this in mind briquettes made from an East Midlands Coal (coal rank code 702), and a stripped tar binder to which one per cent. of a suitable chemical has been added instead of pitch, were carbonised successfully without distortion or fusion in an indirectly heated retort of conventional type. This important discovery could be made the basis of a process for immediate exploitation. Experimental work is continuing, to ascertain to what further types of low-rank coal this process is applicable; so far, successful trials have been carried out with a number of coals of 800 and 900 type.

Another discovery of great importance is of a method of making strong briquettes from practically all types of coal without using a binder, or the high pressures used on the Continent and elsewhere for making brown coal briquettes. Problems of mechanical design remain to be solved, but if these can be successfully overcome, the discovery could be used for the production of briquettes from low-rank coals for later carbonisation. Binderless briquettes made from such coals have in fact been successfully carbonised.

Reactive Fuels for Open Grates

Although the processes just described are for the manufacture of smokeless fuels for closed appliancess, with minor modifications of conditions of carbonisation, they can be used for making the more reactive fuels required for open grates, but the upper limit of ash content that can be tolerated for an open grate fuel is, however, lower than that for a closed appliance fuel. Not only are low-rank coals often difficult to clean, but also the low yield of solid product obtained on carbonisation tends to concentrate the ash. The effect of ash composition on tolerable ash content together with the effect of using additives to modify the physical properties of the ash are being studied.

In their researches into the gasification of coal by the *Lurgi* process, the Gas Council found that the hydrogenation reaction was responsible for the much increased formation of methane in the fuel bed, and went on to consider how this reaction could be made the fullest use of to produce methane for gas enrichment. They have shown that it is an advantage for the coal to undergo a preliminary hydrogenation before gasification. The solid product from the hydrogenation stage is highly reactive, and the possibility of obtaining it in pieces large enough to be used as domestic fuel, by briquetting or otherwise, is being investigated at the Birmingham Research Station.

Experimental Stage

As none of the processes mentioned for the preparation of reactive, open gate fuel has yet passed the experimental stage, no assessment of their financial and economic prospects is immediately possible but may well be, that they will only be possible commercially if a relatively high price can be assured for the products, which may mean that only comparatively small quantities will be produced. For the same reasons, it would probably be unrealistic to look for any very large expansion in the production of low temperature cokes from the existing Coalite and Rexco processes, as the Coalite process uses coal of the same type as that required by the gas industry. For the immediate future, therefore, the demands for smokeless open grate fuel will probably have to be met largely by improved quality coke made in gaswork plants. In general, however, gas cokes, as at present supplied, are unpopular fuels for the open grate because of their low reactivity. In the Grancole process which has been operated for some years at the Granton Gasworks, Edinburgh, however, lump coals of 700-800 rank are carbonised successfully in normal continuous vertical retorts to give a reactive coke, and trials are being carried out at the Fuel Research Station to examine the possibilities of using the process to obtain cokes of sufficient strength from coals of even lower rank. The process is promising in that it can be operated in ordinary gaswork plants at high rates of throughput, and it may become of even greater importance if new requirements for more coke with less gas materialise.

The processes which have been evolved by the National Coal Board for the manufacture of uniformly-sized smokeless fuels from low-rank coals are potentially equally applicable also to the manufacture of foundry and blast furnace coke, so that the most promising of the developments is the process for making binderless briquettes. Further research is being done to overcome the special problem involved in making from feebly caking coals larger briquettes, of greater strength than would suffice for domestic fuel.

Direct Relationship

Fundamental studies connected with the manufacture of coke, carried out by the National Coal Board have shown that for blends of a particular coking coal there is a direct relationship between the fluidity of the coal blends in the plastic state and the hardness of the resultant coke. Fluidity was measured by means of the Gieseler plastometer, but at constant temperature instead of at steadily increasing temperature as in the normal method of use. It was thus possible to distinguish between the changes due to chemical action and those brought about by rising temperature, allowing the former to be investigated. The reactions:

solid coal → fluid coal → semi coke

take place consecutively. The velocity constant for the second change has been measured for a wide range of coals and is found to increase as rank decreases. The influence of temperature has been found to be the same for all coals, 10°C. rise speeding the reaction by the factor 1.7. This corresponds to an activation energy of 50 Kcals. per mole, which agrees well with the activation energy for rupture of the -C-C- link in oil cracking and confirms the chemical nature of the decomposition. The important practical lesson to be learned from this work is that changes in the plastic behaviour of a coal, and consequently changes in the quality of the coke produced from it, will be brought about rather by chemical influences than by attention to physical factors such as particle size.

Laboratory measurements of viscosity by the Gieseler method have been applied successfully to the determination of the composition of coking blends for large scale trials, and for the interpretation of the coking behaviour of specific coals. It has been shown, for example, that even coals having wide plastic ranges may fail to give first class cokes if their minimum viscosities are too low, and that blending of a virtually non-fluid coal with a highly fluid coal to the optimum viscosity may actually improve the shatter index of the coke produced.

In the course of work on the shrinkage of coke, an electrical analogue heat flow computer has been constructed for use in connection with the determination of temperature gradients ruling within the coke oven. This computer has provided a new means for determining the heats of reaction associated with the process of coking; it has been found that these amount to some hundreds of cals. per gram, being endothermic below about 700°C. and exothermic above that temperature. By the use of this computor it has been possible to explain that a certain coal sometimes used in coking blends, when heated in the coke oven for the normal period yields an incompletely carbonised product because this coal has, in fact, a particularly high endothermic heat of reaction below 700°C.

SIR JOHN CASS COLLEGE

THE Sir John Cass College, Jewry Street, Aldgate, E.C.3, has published its prospectus for the 1956-57 session. This describes courses for both internal and external students taking examinations in the faculties of science and engineering, and also includes details of first and second year courses in solid fuel production, distribution and utilisation.

The courses cover: Solid and gaseous fuels, scientific principles of fuel technology, electronic computing systems and electronics, statistical methods in research, courses in mathematics, statistical mechanics, and industrial law. A detailed prospectus containing full particulars of other day and evening courses will be forwarded on application to the Secretary of the College.

HEAT OF REACTION IN THE CARBONISATION OF COAL

'Extremely Difficult Quantity to Measure'

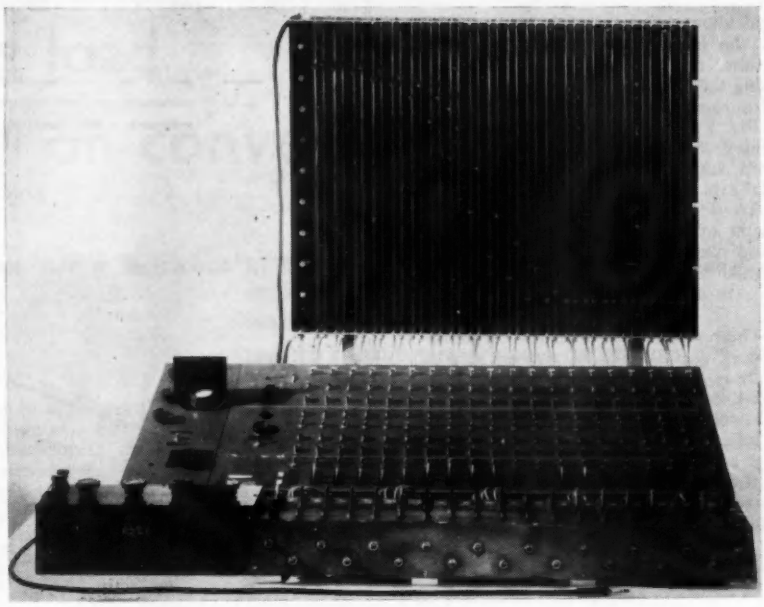


Fig. 1 *Analogue heat flow computor.*

SPEAKING at the discussion on Dr. Idris Jones's paper at the Fifth World Power Conference at Vienna, Dr. J. Bronowski dealt with the measurement of the heat of reaction in the carbonisation of coal.

Low Conductivity

This is an extremely difficult quantity to measure because of the low conductivity of powdered coal. Heat flows which were large enough to be measured set up such large temperature gradients within the coal that it was no longer uniform in temperature. So difficult was this to overcome that no one knew with certainty whether the reaction was endothermic or exothermic. However, by combining forces with Dr. D. J. Millard, research was begun on the analysis of temperature distributions in an experimental oven of the coke oven type where large thermal differences are to be found.

To overcome the very great difficulties which were met, an electrical analogue technique was used, based on the work of Dr. G. Liebman. This technique is carried out by using an electrical calculating machine which gives instantaneous solutions for the heat flow equation for successive instants.

Electrical Simulation

To apply Dr. Liebman's technique, certain quantities which had to be measured had to be simulated electrically. Temperature was simulated by voltage, heat flow by electric current and thermal conductance by heat conductance, but heat capacity was not simulated by electrical capacity, but instead, by making a solution of the problem for each instant of time dependent to a chosen degree on that for the preceding instant. The electrical analogue machine is shown in Fig. 1. The electrical model of the coal is shown in the foreground and the back board consists of twin potentiometers, the position of the slides of which traces two curves across the back board, each corresponding to a temperature distribution in the coal, one of which is calculated for a previous instant of time and the other being calculated for the present instant.

Results

In Fig. 2, the total heat of carbonisation in calories per gramme has been plotted against temperature in degrees C. for two coals and an inert substance of specific heat 0.25. These results show that below about 700°C. there is an endothermic reaction and about that temperature an exothermic reaction.

The two coals represented on the graph, one in Parkgate No. 6 (Rank 502, VM. 34.5%), a coking coal, and the other Waterloo (Rank 801, VM. 32.3%), a low rank coal not normally carbonised. The low rank coal will be seen to need about five times as much heat and the coking

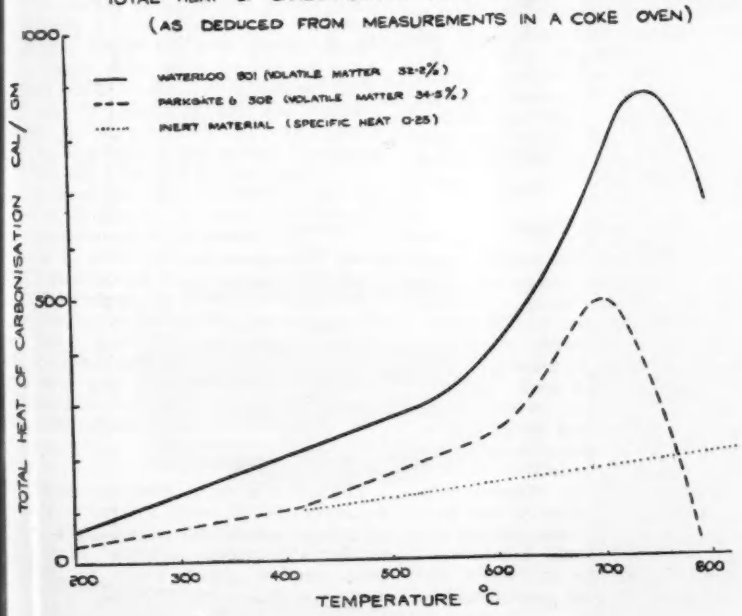
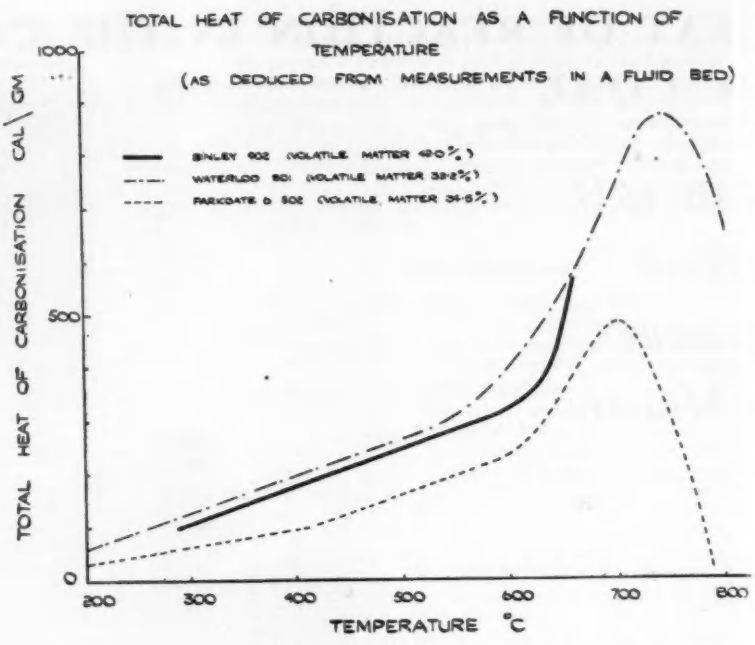


Fig. 2

Fig. 3 ▶



coal about twice as much up to 750°C. as the inert material. To test these results, measurements have been made using the fluid bed technique on the heat of carbonisation. The result is shown in Fig. 3 where the dark line, representing Binley coal (Rank 902, VM. 42.2%) has been superimposed on the results for Parkgate and Waterloo coals already referred to. Though not so complete, the shape of the curve is similar and the steep rise appears in the neighbourhood of 600-700°C.

Alternatives

These results show that the carbonisation of coal absorbs its greatest amount of heat at about 700°C. and heat treatment of coal at this temperature is under the worst conditions of heat demand. Practical alternatives are being studied and carbonisation tests of part of the coal at a temperature below 700°C. and part at 850°C. are in progress, at which temperature much of the heat supplied is regained.

92nd ANNUAL REPORT ON ALKALI WORKS

Complaints of Dust and Grit

IN the 92nd Annual Report on Alkali, etc., Works, which has recently been published, reference is made to a number of processes which are of interest to the gas industry, though gas manufacture itself is not covered by the Chief Inspector's department.

Steam raising plants situated at electric power stations were reported on with a view to investigating the efficiency of flue gas washing, though complaints had been received against dust and grit being deposited in the neighbourhood. The complaint as it happened was caused by an adjoining gasworks. Tests done on sulphur pollution in power station flue gases showed that the plant at Bankside, entirely fired by oil, was working at between 96.7% and 99.2% efficiency. The task of flue gas washing at Battersea which was built some years before the war is much more difficult because of the very great increase in ash content of the fuel used for steam raising since and during the war.

Coke oven plants and gasworks are only registrable under the Chief Inspector's department when these works possess plants for working up by-products and so it has no jurisdiction over conditions of the working of plants other than these, though inspectors generally discuss the problems of smoke and 'green gas' emission with the management. Such precautions against complaints would include the provision of a double gas collecting main, and this is generally being provided at new plants. At one large coke oven plant trouble was being experienced with the recirculation of contaminated water in a direct cooling system and complaints had been received. A change to the indirect system of cooling had to be resorted to.

Horizontal Retorts

Differences between emissions from coke works and gasworks are more a matter of degree than of kind, though horizontal retorts seem the cause of complaints of smoke, grit and the familiar 'gasworks' smell. The emission of grit from water gas plants has been noticed, but little can be done about this until they are taken out of service for overhaul or general repairs.

Gas Liquor Plants

The report refers to the care that must be exercised over the running and maintenance of gas liquor plants. Though their remarks only refer to plants other than sulphate of ammonia plants, the points raised apply to these too. The report points out that great care must be taken in the running of such plants to avoid blockages and dangers from corrosion in the structure through which hydrogen sulphide may leak out into the surrounding atmosphere. Recommendations are made that where the foul gases are absorbed in iron oxide purifiers the changeover valves should have careful attention paid to them and, where conditions permit, the foul gases should be returned to the main works foul gas main via a suitable seal. During the year only in three cases were conditions bad enough to be considered infractious of the regulations.

Tar Distillation

The report goes on to point out that the number of registered tar distillation works is continuing to fall, and by last year it had fallen again from 139 to 136, compared to 228 registrations in 1945 and 372 in 1920. This is due to the concentration of tar distilleries into a smaller number of much larger works as is shown by the very much larger quantity of tar distilled in 1955 than in 1920. The erection and commissioning of continuous tar stills continues, and as the problem of dealing with emissions is very much simpler with continuous stills than with the intermittent still, the cessation of complaints seems to be entirely due to the replacement of the intermittent still. There were six infractions of the regulations, two of them in connection with the unsatisfactory arrangements for the disposal of foul gas on benzol wash oil regeneration units, and three in connection with similar arrangements on intermittent pot stills. A very much more serious case was the fume emission from a makeshift pitch palleting plant.

48 Infractions

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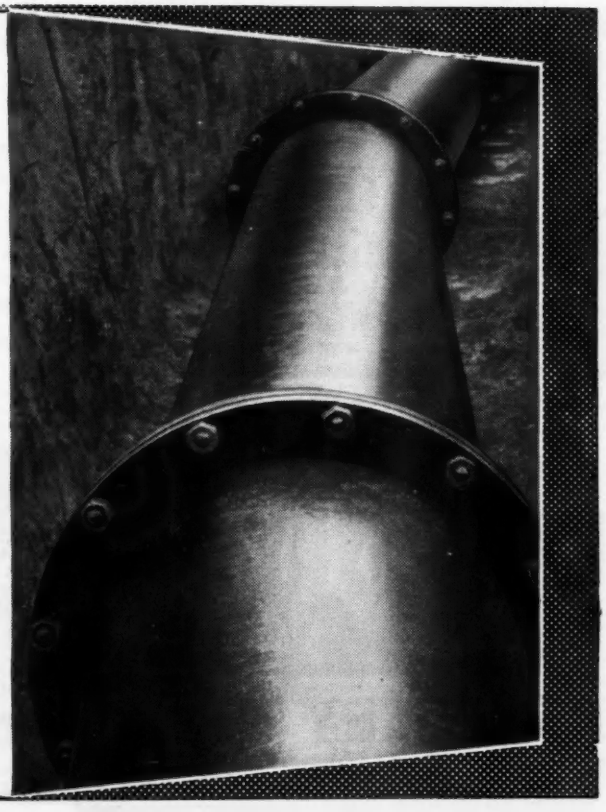

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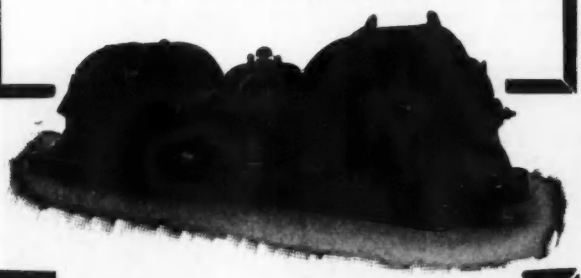
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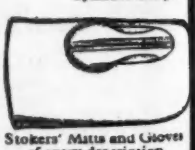
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PUBLISHERS' NOTICE

The " Gas Journal " is published every Wednesday, price 1/6d.; by post 1/8d.

Subscription Rates: Home and Empire:—60/- per annum; Foreign:—70/- per annum. (Both payable in advance.) A copy of the " Gas Journal " Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at 2/6 per line (approx. 7 words)—minimum charge 10/-. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10 in. deep × 7 in. wide; block screen 120.

BUSINESS MANAGER: S. T. CULLEN

NORTHERN MANAGER: Philip W. B. King, Flat 1, 7 Langcliffe Avenue, Harrogate. *Telephone:* Harrogate 67625.

SOUTHERN & MIDLANDS REPRESENTATIVE: A. Engelhardt, T.D., 11, Bolt Court, Fleet Street, E.C.4. *Telephone:* Fleet Street 2236-7.

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PUBLICATIONS

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APPOINTMENTS VACANT

WEST MIDLANDS GAS BOARD

WOLVERHAMPTON & DISTRICT DIVISION
DISTRICT INSPECTOR, SOUTHERN GROUP

CANDIDATES must possess a sound knowledge of domestic appliances, gasfitting and consumer service, and must hold the City and Guilds of London Final Certificate for Gasfitting.

The salary will be within A.P.T. Grade 5 (£610 to £690 per annum) of the National Salary Scales for Gas Staffs. The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications and experience, together with the names of two referees, should be addressed to Mr. S. Jones, Divisional General Manager, West Midlands Gas Board, Kensington House, Bath Street, Dudley, to reach him not later than September 12, 1956.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

WOLVERHAMPTON AND DISTRICT DIVISION
VACANCY FOR DIVISIONAL COKE OFFICER

THE successful candidate will be required to co-ordinate and develop the sales of coke within the Division. He will also be responsible for the efficient operation of vehicles used for delivery.

The salary for the post will be within A.P.T. Grades 8/9 (£710-£855 per annum) of the National Salary Scales for Gas Staffs.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications stating age, qualifications and experience, together with the names of two referees, to Mr. S. Jones, Divisional General Manager, West Midlands Gas Board, Kensington House, Bath Street, Dudley, to reach him not later than September 17, 1956.

J. C. INGRAM,
Secretary to the Board.

WEST MIDLANDS GAS BOARD

WALSALL AND DISTRICT DIVISION

APPLICATIONS are invited for the following posts at the Smethwick Gas Works:

SENIOR ASSISTANT WORKS CHEMIST.

Candidates should be capable of carrying out normal Gas Works tests and of undertaking special investigations connected with gasmaking processes. Possession of the Higher National Certificate in Chemistry or equivalent qualification would be an advantage.

Salary will be within the range of A.P.T. Grade 8 (£710-£790 p.a.) of the National Scales.

ASSISTANT WORKS CHEMIST.

Candidates should have practical experience of routine testing and have received an education up to the standard of the Ordinary National Certificate in Chemistry or its equivalent.

Salary will be within the range of A.P.T. Grade 7 (£670-£750 p.a.) of the National Scales.

The posts are pensionable, and the successful candidates may be required to pass medical examinations.

Applications stating age, qualifications, details of training and experience, together with names of two referees, should be adressed to Mr. F. Harvey, Divisional General Manager, West Midlands Gas Board, Walsall Factory Estate, Tame Bridge, West Bromwich Road, Walsall, to reach him not later than September 17, 1956.

J. C. INGRAM,
Secretary to the Board.

NORTH WESTERN GAS BOARD

NORTH CHESHIRE GROUP
DEPUTY STATION ENGINEER—DENTON NEW WORKS

APPLICATIONS are invited for the above pen-sionable appointment at a commencing salary of £1,050 p.a.

The successful applicant will be responsible to the Station Engineer for the operation of a completely new works with a capacity of 20 million cu.ft. per diem. Applicants should have wide experience and hold the Associated Membership qualification of a recognised engineering or chemical institution.

Detailed applications, giving the names of two referees, should reach the General Manager, N.W.G.B., North Cheshire Group, Gas Works, Portwood, Stockport, within 14 days.

(*Classified advertisements continued on page* 580)

APPOINTMENTS VACANT (ctd.)

TECHNICAL ASSISTANT with knowledge of heating and gas engineering capable of estimating heat losses and willing to be trained for very interesting and congenial post, required for work in West London in connection with a new type of gas space heating. Excellent prospects. Write No. 292, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4. giving full particulars and indicating salary required.

SCOTTISH GAS BOARD

PERTH GROUP
TECHNICAL ASSISTANT (DISTRIBUTION)

APPLICATIONS are invited for the post of TECHNICAL ASSISTANT (Distribution) at Perth. Experience in installations and/or Mainlaying Work required. The salary offered is Provincial A, Grade A.P.T. VII (£670-£750 per annum) with placing according to qualifications and experience. The post is pensionable and the person appointed will be required to pass a medical examination.

Applications, stating age, education, training, qualifications and experience, should reach the undersigned within two weeks from the appearance of this advertisement.

W. NICOL BAIRD,
Group Manager.

Gas Works,
Friarton,
Perth.

SCOTTISH GAS BOARD

PERTH GROUP
HOME SERVICE ADVISER

APPLICATIONS are invited for the position of SENIOR HOME SERVICE ADVISER for the Group.

Candidates should possess a recognised qualification in Domestic Science and have experience in the organisation of Cookery Demonstrations, Lectures and Home Service Calls.

The salary offered is Provincial 'A,' Grade A.P.T. V (£475-£539) with placing according to qualifications and experience. The post is pensionable and the person appointed will be required to pass a medical examination.

Applications, stating age, education, training, qualifications, experience, and the names of two persons to whom reference may be made, should reach the undersigned within two weeks from the appearance of this advertisement.

W. NICOL BAIRD,
Group Manager.

Gas Works,
Friarton,
Perth.

SCOTTISH GAS BOARD

DUNDEE GROUP
DUNDEE DISTRICT
JUNIOR TECHNICAL ASSISTANT
(LABORATORY)

APPLICATIONS for the above position are invited from young men of at least 21 years of age who have gained the Lower National Certificate in Chemistry, or a similar qualification.

The Salary Scale applicable to the post is APT 2/6 Provincial 'A' of the National Salary Scales (£385 to £690 per annum, with placing according to qualifications.

The position is pensionable, and the successful applicant will be required to pass a medical examination.

Applications, stating age, and giving particulars of education, training, experience and qualifications should be addressed to W. S. Johnston, Group Manager, Scottish Gas Board, Dundee Group, Dundee District, 50, East Dock Street, Dundee, to arrive not later than 14 days after the appearance of this notice.

SCOTTISH GAS BOARD

LANARKSHIRE DIVISION
AIRDRIE DISTRICT UNDERTAKING
SENIOR TECHNICAL ASSISTANT

APPLICATIONS are invited for the above appointment. The successful candidate will be responsible for the technical control of the Gas Production Plant and should have a thorough working knowledge of Continuous Vertical Retorts and Ancillary Gas Works Plant.

Candidates should be qualified, or about to qualify for Corporate Membership of the Institution of Gas Engineers. The appointment carries a salary of Provincial 'A' A.P.T. 6 (£610-£690 per annum) with placing according to qualifications and experience.

Applications endorsed "Senior Technical Assistant" giving the names of two referees and full particulars of education, training and experience should reach the undersigned not later than Monday, September 17, 1956.

GEORGE E. H. KEILLOR,
District Manager.

Gas Works,
Mill Street,
Airdrie.

August 29, 1956.

SCOTTISH GAS BOARD

SOUTH EAST DIVISION
GALASHIELS SUB GROUP

APPLICATIONS are invited for the post of MANAGER of the above-named Sub Group. Candidates, who should be corporate members of the Institution of Gas Engineers, must have administrative experience, and a sound and extensive knowledge of modern methods of gas manufacture and distribution. The duties include management of the Galashiels District, and supervision of the five other undertakings in the Sub Group.

The salary for the appointment will be in accordance with Group 'B' of the National Salaries Table for Senior Gas Officers (£1,045-£1,265 per annum) plus a responsibility allowance of £100 per annum. A house will be available.

The position is pensionable, and the successful applicant will be required to pass a medical examination.

Applications stating age, and giving full particulars of education, training, experience and qualifications, should be addressed to the Divisional Controller, to arrive not later than Saturday, September 15, 1956.
25, Chester Street,
Edinburgh, 3.

TECHNICAL ASSISTANT

CAPE TOWN—SOUTH AFRICA

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Hanover House,
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'Phone: HOLborn 9439 (office hours).

NORTHERN GAS BOARD

DARLINGTON DIVISION
SENIOR TECHNICAL ASSISTANT—
DARLINGTON UNIT

APPLICATIONS are invited for the position of SENIOR TECHNICAL ASSISTANT at the Darlington Unit.

Applicants should be qualified to undertake full responsibility, under the Works Manager, for supervision of the chemical staff, control of a G.W. Vertical Retort Installation, modern C.W.G. Plants and ancillary equipment. Corporate Membership of the Institution of Gas Engineers or equivalent qualification will be an advantage.

The salary will be within Grade APT. 9 Provincial 'A' (£755 to £855 per annum) of the National Salary Scales, initial placing according to experience and qualifications.

The successful applicant will be required to pass a Medical Examination and join the Board's Pension Scheme.

Applications, stating age, experience, qualifications and the names of two persons to whom reference can be made should be addressed to the undersigned not later than September 21, 1956.

F. WILSON,
Divisional General Manager.

Gas Offices,
John Street,
Darlington.

EAST MIDLANDS GAS BOARD

LEICESTER AND NORTHANTS DIVISION
LOCAL SUPERINTENDENT—MARKET
HARBOROUGH (LEICESTERSHIRE)

APPLICATIONS are invited from suitably qualified persons for the position of LOCAL SUPERINTENDENT, Market Harborough. The appointment will be made within Grades APT. 6/7 (£610-£750 per annum).

Market Harborough is a non-manufacturing Undertaking, and there are approximately 3,400 consumers in the district. The Undertaking forms part of the Leicester Group, and whilst overall control is exercised from Group Headquarters the Local Superintendent will be directly responsible for sales and consumer service, and minor distribution work in the district.

A self-contained flat is available on reasonable terms under a standard Service Occupation Agreement, for the person appointed.

The post is pensionable, and the successful applicant will be required to pass a medical examination.

Applications stating age and giving details of education, qualifications and experience, together with the names of two referees, should be addressed to reach the undersigned not later than September 15, 1956.

H. B. TAYLOR,
Divisional General Manager.

Gas Offices,
Millstone Lane,
Leicester.

August, 1956.

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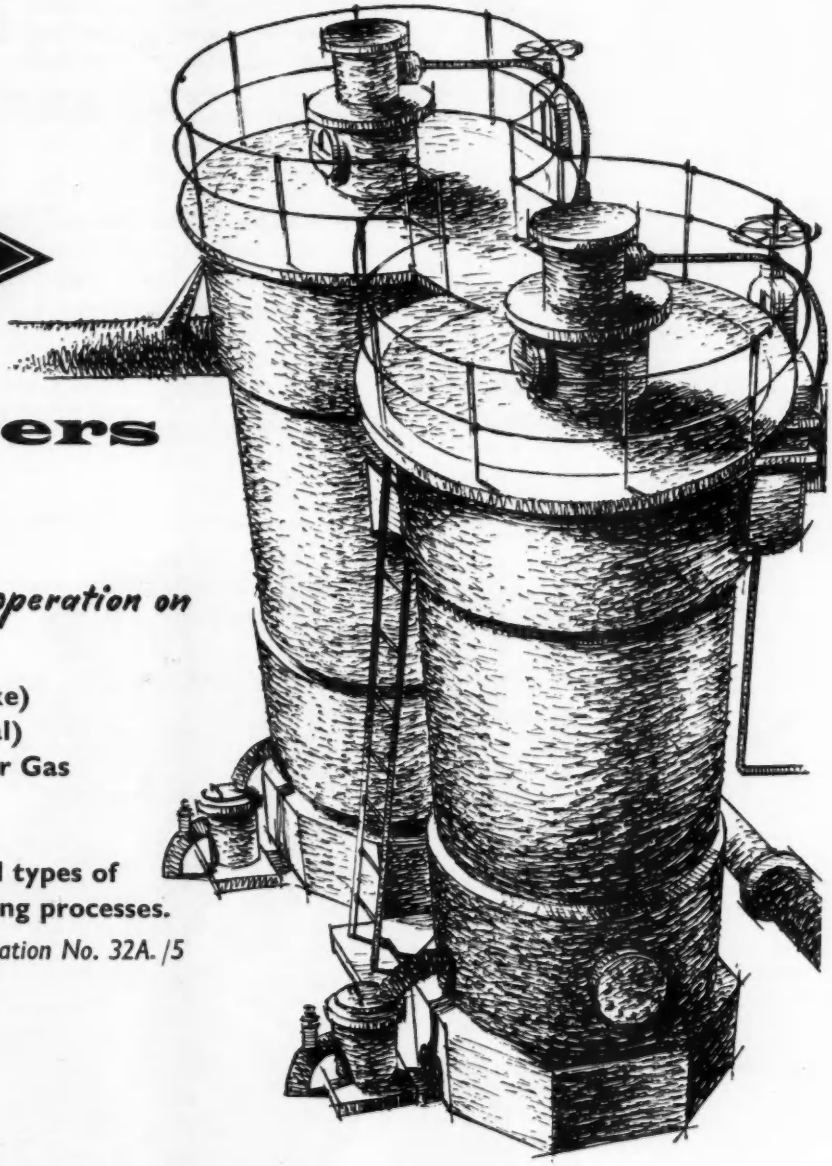

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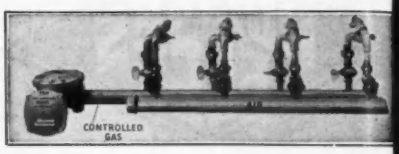

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A.D. 30

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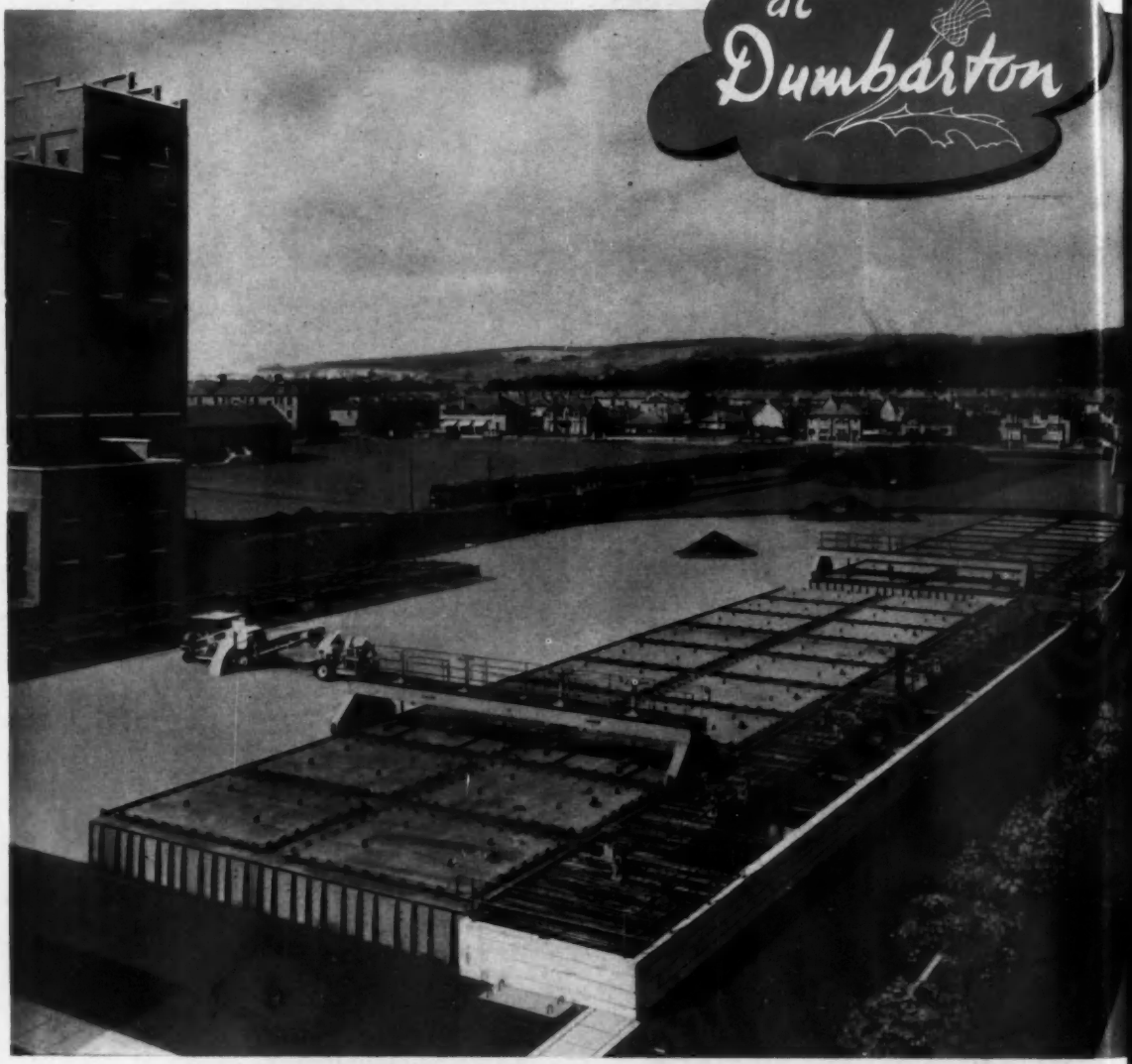

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